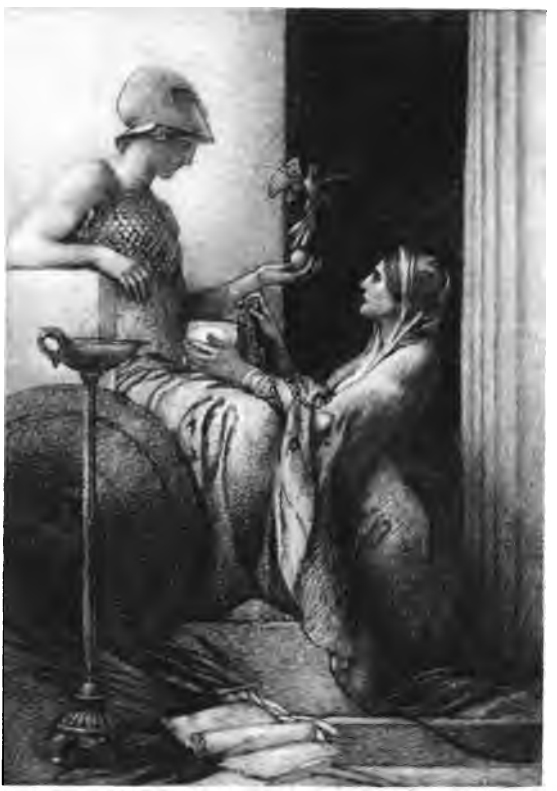

THE

CONCHOLOGIST:

A

QUARTERLY MAGAZINE FOR CONCHOLOGISTS.

EDITED BY

WALTER E. COLLINGE.

VOL. I.

LONDON:
SWAN SONNENSCHEIN & CO.

1891.

PREFACE.

In completing the First Volume of "The Conchologist," we beg to thank the contributors and supporters thereto for their kind appreciation and support during the past year.

Looking back upon the history of conchology for the last twenty-five years, it does not reveal a state of things at all creditable to British conchologists; but little has been added to our knowledge of the structure or development of the mollusca, and, were it not for the researches of two or three biologists, we might almost say nothing had been published on the subject, whereas upwards of twenty works, systematic, &c., have been written, a number of which are but "repetitions of a twice-told tale," and some woefully inaccurate.

It is much to be regretted that by far the greater number of conchologists (if they are deserving of the name) are little more than mere collectors: the collection and exhibition of shells forming the sum total of their endeavours. Long ago we were told by Müller that shells had amused us sufficiently, their beauty of colour and form had called forth enough of mere wonder, and that it was high time we left such amusement to children and became men and studied the living inmates, their structure and manners.

Our object in commencing "The Conchologist" was, and is, to endeavour to raise the interest in, and show the importance of, the study of the Anatomy, Embryology, Life-History, and Variation of the Mollusca, and to present a medium for the interchange of thought and the promotion of the interests of all students working in these branches of science. With this aim we shall still continue, encouraged by our past success, inviting the continued and hearty support of all who approve of our intentions, sincerely thanking all contributors and supporters, and relying to a large extent upon them to make Volume II. even more successful than its predecessor.

W. E. C.

St. Andrews, N.B.

LIST OF AUTHORS

WHO HAVE CONTRIBUTED TO VOLUME I.

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THE CONCHOLOGIST.

VOLUME I.

MARINE SHELLS OF NORTH WALES.

By Rev. CARLETON GREENE, M.A.

The following list is the result of three visits made in 1881, 1882, and 1889. I have availed myself of the aid of other collectors in compiling it, and have to acknowledge especially the assistance of Miss E. Harrison, of Hendremynach, Barmouth; Rev. H. Milnes, of Winster; and Miss Edwards, of Bury St. Edmunds. The records contained in Jeffrey's "British Conchology" and other works have been incorporated for the sake of completeness, and are printed in italics. The reputation of Mochras as a hunting-ground appears to have declined lately, and I am informed that at Barmouth the most interesting shells have disappeared since the laying down of the new sewer-pipe. Under the term Barmouth in this list is included all the coast south of Mochras and north of Towyn. The only place where shells were found at my last visit was at the mouth of Tal-y-bont stream, about two miles north of Llanaber Church. There may be many out-of-the-way places yet to be explored, especially in the Lleyn promontory of Carnarvonshire; but the following list alone shows, I think, that North Wales possesses a great range of species, and deserves a high place as a region of conchological interest.

Anomia ephippium. Colwyn Bay, Mochras, Barmouth, Portmadoc.
A. ephippium var. **aculeata.** Barmouth.
Ostrea edulis. *Passim.*
Pecten varius. Colwyn Bay, Barmouth.
P. varius var. **nivea.** Barmouth.
P. opercularis. Colwyn Bay, Barmouth, Mochras, Portmadoc.
P. maximus. Harlech, Mochras, Barmouth, *Anglesea.*
Lima hians. *Anglesea.*
Mytilus edulis. Portmadoc, Colwyn Bay, Barmouth.
M. edulis var. **incurvata.** Barmouth.
M. edulis var. **gallo-provincialis.** Barmouth.

M. edulis var. **pellucida.** Barmouth, *Anglesea.*
M. modiolus. Colwyn Bay.
M. modiolus umbilicata. *Anglesea.*
M. barbatus. Penmaenmawr, *Menai Straits.*
Nucula nucleus. Colwyn Bay, Mochras, Barmouth, Portmadoc.
N. nucleus var. **radiata.** Barmouth.
N. nitida. Barmouth.
Pectunculus glycimeris. Mochras, Barmouth, Portmadoc.
Lepton squamosum. *Anglesea.*
L. Clarkiæ. *Barmouth.*
Loripes lacteus. *Lleyn.*
Lucina borealis. Mochras, Barmouth.
Axinus flexuosus. Portmadoc.
Cardium echinatum. Harlech, Penmaenmawr, Barmouth, Portmadoc.
C. echinatum var. **ovata.** *Barmouth.*
C. tuberculatum. Colwyn Bay, Mochras, Harlech, Barmouth, Portmadoc.
C. exiguum. Mochras, Barmouth.
C. edule. Colwyn Bay, Barmouth, Portmadoc.
C. Norvegicum. Mochras, Barmouth.
Cyprina islandica. Mochras, Penmaenmawr, Barmouth, Portmadoc, *Carnarvonshire.*
Venus exoleta. Mochras, Penmaenmawr, Barmouth.
V. lincta. Colwyn Bay, Barmouth, Portmadoc.
V. chione. Mochras, Harlech, Barmouth, *Carnarvon Bay.*
V. fasciata. Barmouth, *Menai Straits.*
V. casina. Mochras, Barmouth.
V. verrucosa. Mochras, Barmouth, *Pwllheli.*
V. gallina. Colwyn Bay, Mochras, Harlech, Penmaenmawr, Barmouth, Portmadoc.
Tapes aureus. *Pwllheli*, Portmadoc.
T. virgineus. Barmouth, Portmadoc.
T. pullastra. Colwyn Bay, Mochras, Barmouth, Portmadoc.
T. decussatus. Colwyn Bay, Mochras, Barmouth.
Lucinopsis undata. Mochras, Barmouth.
Tellina crassa. Harlech, Mochras, Penmaenmawr, Barmouth.
T. Balthica. Mochras, Barmouth, Portmadoc.
T. tenuis. Colwyn Bay, Mochras, Barmouth, Portmadoc.
T. fabula. Colwyn Bay, Barmouth.
T. pusilla. Barmouth or Mochras.
Psammobia Ferröensis. Colwyn Bay, Barmouth, Penmaenmawr, Portmadoc.

P. vespertina. *Pwllheli*, Barmouth.
Donax vittatus. Barmouth?
D. trunculus. Colwyn Bay, Mochras, Barmouth, Portmadoc.
Mactra solida. Colwyn Bay, Mochras, Harlech, Barmouth, Portmadoc.
M. solida var. **elliptica.** Mochras, Barmouth.
M. subtruncata. Colwyn Bay, Barmouth.
M. stultorum. Colwyn Bay, Mochras, Harlech, Barmouth, Portmadoc.
M. stultorum var. **cinerea.** Barmouth, Portmadoc.
Lutraria elliptica. Mochras, Penmaenmawr, Harlech, Barmouth.
L. oblonga. Harlech.
Scrobicularia prismatica. Barmouth.
S. alba. Barmouth or Mochras.
S. piperata. Harlech, Conway, Mochras, Barmouth, Portmadoc.
Solecurtus candidus. Mochras.
Ceratisolen legumen. Colwyn Bay, Harlech, Mochras, Barmouth, Portmadoc, *Anglesea.*
Solen pellucidus. *Carnarvonshire*, Barmouth, *Anglesea.*
S. ensis. Colwyn Bay, Mochras, Barmouth, Portmadoc.
S. siliqua. Mochras, Barmouth, Portmadoc.
S. vagina. Colwyn Bay, Mochras, Harlech, *Anglesea*, Barmouth, Portmadoc.
Thracia papyracea. Colwyn Bay, Penmaenmawr, Barmouth.
Corbula gibba. Mochras, Penmaenmawr, Barmouth.
Mya arenaria. Barmouth.
M. truncata. Barmouth, Colwyn Bay, Penmaenmawr, Portmadoc.
Saxicava rugosa. Penmaenmawr, Barmouth.
S. rugosa var. **arctica.** Barmouth.
Gastrochæna dubia. *Barmouth.*
Pholas dactylus. Mochras, Barmouth.
P. candida. Barmouth, Colwyn Bay, Portmadoc.
P. parva. *Abergele* (?), Barmouth, *Denbighshire.*
P. crispata. Penmaenmawr.
Teredo Norvegica. Barmouth or Mochras.
Dentalium entalis. Colwyn Bay, Mochras.
D. tarentinum. *Cardigan Bay*, Barmouth.
Chiton fascicularis. Barmouth or Mochras (?).
C. cinereus. Barmouth.
C. albus. Barmouth.
C. marginatus. Colwyn Bay, Mochras, Barmouth.

Patella vulgata. Colwyn Bay, Barmouth, Portmadoc.
P. vulgata var. **depressa.** Barmouth, Portmadoc.
P. vulgata var. **elevata.** Mochras.
Helcion pellucidum. Mochras, Barmouth, *Beaumaris.*
H. pellucidum var. **lævis.** Barmouth.
Tectura virginea. Barmouth, *Beaumaris.*
Emarginula fissura. Barmouth or Mochras.
Fissurella græca. Mochras, Barmouth.
Capulus Hungaricus. Barmouth.
Trochus magus. Mochras, Barmouth, *Anglesea*, Portmadoc.
T. cinerarius. Colwyn Bay, Mochras, Barmouth, Portmadoc.
T. umbilicatus. Colwyn Bay, Mochras, Penmaenmawr, Barmouth, Portmadoc.
T. lineatus. Mochras, Barmouth, *Pwllheli*, *Anglesea.*
T. tumidus. Barmouth.
T. ziziphinus. Penmaenmawr, Barmouth.
T. ziziphinus var. **lævigata.** *Anglesea.*
Phasianella pulla. Mochras, Barmouth.
Lacuna divaricata. Barmouth, Portmadoc.
L. puteolus. Barmouth.
L. pallidula. Mochras, Barmouth.
Littorina obtusata. Colwyn Bay, Mochras, Barmouth, Portmadoc.
L. rudis. Barmouth, Portmadoc.
L. rudis var. **tenebrosa.** Barmouth.
L. rudis var. **similis.** Barmouth.
L. littorea. Colwyn Bay, Mochras, Barmouth, Portmadoc.
Rissoa parva. Mochras, Barmouth.
R. parva var. **interrupta.** *Menai Str.*
R. violacea. *Barmouth.*
R. striata. Barmouth.
R. cingillus. Barmouth. *Menai Str.*
Hydrobia ulvæ. Portmadoc.
Cæcum trachea. *Barmouth.*
Turritella terebra. Colwyn Bay, Mochras, Barmouth, Portmadoc. *Pwllheli.*
Scalaria communis. Mochras, Harlech, Barmouth, Portmadoc.
Aclis ascaris. *Barmouth.*
Odostomia plicata. *Barmouth.*
O. dolioliformis. *Barmouth.*
O. decussata. *Barmouth.*
Enlima sublata. *Anglesea.*
Natica catena. Colwyn Bay, Mochras, Barmouth, Portmadoc.

N. Alderi. Mochras, Barmouth.
Adeorbis subcarinatus. *Barmouth.*
Lamellaria perspicua. Barmouth.
Velutina lævigata. Barmouth.
Aporrhais pes-pelicani. Mochras, Barmouth, Portmadoc. *Carnarvonshire.*
Cerithium reticulatum. Mochras, Barmouth, Portmadoc.
Purpura lopillus. Colwyn Bay, Mochras, Barmouth.
P. lapillus var. **imbricata.** Barmouth.
Buccinum undatum. Colwyn Bay, Barmouth, Mochras.
Murex erinaceus. Mochras, Barmouth, Portmadoc.
Fusus antiquus. Mochras, Harlech, Barmouth, Portmadoc.
Nassa reticulata. Mochras, Barmouth.
N. incrassata. Mochras, Barmouth.
N. pygmæa. Mochras.
Defrancia gracilis. *Anglesea*, Barmouth, Portmadoc.
Pleurotoma attenuata. Barmouth.
P. septangularis. *Anglesea.*
P. rufa. Penmaenmawr, Barmouth.
P. nebula. Mochras, Barmouth.
P. turricula. Mochras, Penmaenmawr, Barmouth.
Cypræa Europœa. Colwyn Bay, Mochras, Barmouth, Portmadoc.
Cylichna cylindracea. Mochras, Barmouth, Portmadoc.
C. alba. Barmouth.
Utriculus obtusus. Barmouth or Mochras.
Actæon tornatilis. Mochras, Harlech, Barmouth, Portmadoc, Beaumaris.
Scaphander lignarius. Penmaenmawr, Barmouth, Beaumaris.
Philine aperta. Barmouth.
Melampus myosotes. *Aberavon.*

The number of species enumerated in this list is 135, and 19 varieties.

SLUGS AND FROST.

By E. J. LOWE, F.R.S., &c.

It has been noticed that excessively cold winters, instead of (as generally supposed) destroying slugs, have a contrary effect, and this is very noticeable at the present time. A less frost with mild intervals, inducing the slugs to leave their winter quarters, would be more destructive than a continuous frost.

When the late frost commenced, the slugs congregated under leaves (good resisters of cold), but as the severity increased they disappeared, descending deeper and deeper into worm holes, &c., where they would find a warmer temperature, but, now the frost has ceased, they are again on the surface, apparently with no diminution in their numbers.

The following records bearing on this subject will be instructive. In the frost of 1860-61, and again in that of 1879-80, some experiments were made as regards the amount of frost sufficient to kill slugs, &c. These may be briefly stated. A bell-glass was placed on a slate, under which were *Arion ater*, *Limax flavus*, *L. maximus*, *L. agrestis*, and *Amalia marginata*.* When the temperature fell to 14°, the slugs were frozen and stiff, and not one recovered, so that 18° of frost is enough to destroy their lives. *Helix aspersa*, under another glass, survived; it, like other non-operculated slugs, had a covering of a light layer of mucus (impregnated with calcareous salts), which had the power of resisting many degrees of frost, for as salt water requires a greater degree of cold to freeze it than fresh water, no doubt this layer of mucus was a sufficient protection. The common gnat (*Culex pipiens*), and larva of the weevil (*Curculis sulcatus*), were similarly treated, and when the temperature fell to 20° (12° of frost), the gnats fell dead, and the weevil larva became frozen and perished.

Frost will, with difficulty, penetrate organic soil and decomposing leaves. At Highfield House, near Nottingham, in the great frost of 1860-61, when the temperature fell to 8° below zero at four feet above the ground, and to 13·8° below zero on the grass—a drain, cut through a bed of organic soil (mainly composed of nut branches), had a temperature four inches below the surface, of 42° above zero, *i.e.* 55·8° higher than on the grass at a few yards' distance. Although the river Trent was frozen, this drain, only one foot wide, and containing less than twelve inches (in depth) of water, remained unfrozen, the heat of this ancient bed of organic matter keeping off frost. Here *Limax lævis* was found, under pieces of wood, regardless of the great cold.

The temperature at different depths in the ground, and the time occupied in reaching those depths is an interesting enquiry, for we

* On reporting these experiments to my friend, the late Dr. Gwyn Jeffreys, his attention was called to peculiarities in the animal of the members of the *Limax* family that did not exist in *Amalia marginata*, but he thought they were not sufficient to warrant the adoption of a separate genus for *Amalia marginata* and *gagates*. More recently, the great difference observed in the time occupied in coition, viz. :—only forty seconds with *Limax agrestis*, and from six to eight hours with *Amalia marginata*, seems to be a convincing proof that these two slugs cannot belong to the same genus.

find that the cold on the 2nd February, 1888, did not reach the depth of twenty-four feet until June 6th, and that the annual range of temperature, though 44·2° on the ground, is only 3·7° at twenty-four feet. Two distinct examples will suffice to make this clear.

Example 1.—The temperature in 1888, on February 2nd, at the Royal Observatory, at various depths:—

On the grass (minimum),	10·8°.		
1 inch in the ground	... 32·0°.		
3 feet „	... 39·0°.	The minimum not reached till	Feb. 4th.
6 feet „	... 43·8°.	„ „	Feb. 7th.
12 feet „	... 44·7°.	„ „	Apr. 18th.
24 feet „	... 48·1°.	„ „	June 6th.

The annual range of temperature for 1888 was:—

4 feet above ground in shade	69·3°.
On grass	44·2°.
1 inch in the ground	38·6°.
3 feet „	23·3°.
6 feet „	15·1°.
12 feet „	10·2°.
24 feet „	3·7°.

Example 2.—Reading of thermometer in 1860 on July 18th, at the commencement and in the centre of the total eclipse of the Sun,* showing the amount of cold caused by this eclipse and the length of time that occurred before this cold reached various depths:—

Black bulb thermometer, in vacuo in sunshine	130·0°,	this fell	65·0°
Ditto, not in vacuo	104·0	„	38·5°
On grass	90·5	„	36·5°
Half an inch in the ground	78·5	„	8·4°
1 inch in the ground	76·2	„	5·2°
2 inches „	74·4	„	1·9°
4 inches „	73·0	„	0·4°
6 inches „	71·3	„	0·0

The coldest point was experienced on the ground during the total phase, but it was, twenty minutes later, half an inch in the ground; thirty minutes later, one inch deep; fifty-five minutes later, at two inches deep; an hour and a half later, at four inches deep; and this cold had not reached six inches deep in five hours, showing how slowly cold descends into the ground. Before the eclipse was total, *Arion ater* and *Helix pisana* were moving about as if it were evening; the latter was exceedingly common.

SHIRENEWTON HALL,
8th February, 1891.

* These observations were recorded by myself at Fuente del Mar near Santander in North Spain, where I had charge of the meteorological observations for the Admiralty in the "Himalya Eclipse Expedition."

ON THE MOLLUSCAN SHELL AND PERIOSTRACUM.

By H. E. QUILTER.

THE morphology and physiology of the external covering of the Mollusca has often been discussed, but the entire relationship of the shell to the animal, of which it is a portion, or protects, is not so familiar a subject. The words "the entire relationship of the shell to the animal" are here used in a very broad sense. Through or by what evolutionary phases has the animal become possessed of a shell, and what have been the determining influences exerted in order to produce in the shell itself the extremely numerous varieties of form and colour?

Most conchologists are aware that the general structural features of molluscan shells are that they consist of carbonate of lime, with an organic substance, usually having a laminated texture, and in addition to this, an external layer, consisting of palisade-like prisms placed side by side. Finally on the outer surface of the shell, a horny cuticle, termed the periostracum, is usually present.

The shell thus commonly consists of three distinct layers, distinguished as nacreous or pearly, prismatic, and epidermic.

The nacreous or pearly layer lies next to, and is secreted by the surface of the animal mantle. The outer prismatic layer is said to be formed only by the free edge of the mantle. The external horny cuticle, "epidermis" or periostracum, being secreted by the extreme edge of the mantle, where also the pigments or colouring matters are principally formed or secreted.

The periostracum appears to be the first formed substance, and next the prismatic layer, by which the shell increases in superficial extent, the shell increasing in thickness by the continued deposition of the nacreous layer. The growth of the shell is thus effected in two ways:—the increase in size by additions to the epidermic and prismatic layers, and in thickness by continued deposition of the nacreous layer. The proposition has been brought forward that the prismatic layer has been formed by the re-arrangement of the particles of carbonate of lime of which it is composed, into a crystalline condition. This has been objected to on the grounds that the prismatic layer is formed where the growth of the shell goes on most rapidly, its apparent existence there independent of the nacreous layer, and that the calcareous particles in its substance do not possess a crystalline character. Another theory has been brought forward

to the effect that the shell grows by intussusception. This may be better expressed by saying that the shell itself has life, and formulates from the carbonate of lime in its surrounding medium, and in connexion with the animal, an external and protective shell.

According to its chemical composition the shell consists of carbonate of lime—($CaCo_3$), and an organic matrix, called conchyolin, usually presenting a laminated structure. In any investigations into the formation and character of the molluscan shell, the mineralogical and chemical characters of the calcic carbonate should be borne in mind. Both these factors, it is probable, play an important part in the formation of the shell.

The hexagonal-form of the carbonate of lime (or more correctly aragonite, as mineralogists term this form), is one that is common to that mineral in a state of nature. It would appear as though the prismatic layer of the shell has changed its character since its secretion by the animal—there being as it were two forces at work, the animal secreting the amorphous particles, while another force is converting these amorphous particles into a crystalline condition. As we shall see, however, I do not think this is probable.

All molluscan shells, at some period of their growth, possess an epidermal covering, formed at the margin of the animal mantle, termed the periostracum. It is formed in advance of the shell, and varies greatly in thickness and the form it may assume. It is mainly composed of an organic substance termed "chitin," having a complex chemical composition ($C_{15}H_{26}N_2O_{10}$). This chitinous cuticle is generally supposed to protect the shell from decomposition by the carbonic acid gas usually present in the waters where the mollusca exist.

The developmental history of the shell is of some importance, as the bearing of embryology upon morphological and physiological questions is universally recognised. Unfortunately, the information at hand upon this point is somewhat meagre, more attention having naturally been paid to the development of the animal, the history of the shell being of secondary importance. The embryological history of mollusca show they all undergo a metamorphosis, which transformation may be passed through either within or outside of the egg-capsule. Very often a change of shell takes place, the embryonic shell being cast, a new shell being formed in its place. The typical larva of a mollusc, as Lankester has pointed out, is essentially similar to the larva of a number of invertebrate types, and especially the Chætopoda, with the addition of certain special organs characteristic of the mollusca. The characteristic molluscan organs are:—a foot between the mouth and

anus, and an invagination of the epiblast of the dorsal side at the hinder end of the body, which is connected with the formation of the shell, called the shell-gland. Within this shell-gland the larval shell is more commonly preceded in its development by the appearance of a plug of chitinous matter. There is a definite order in the embryonic development of the molluscan larva up to this point, but in its subsequent development and metamorphosis the subject becomes complicated, proving the existence of original disturbing conditions. These have produced corresponding effects upon the animal, and consequently upon the form, and in some measure the production of an external shell. These disturbing elements may have been due to the differences induced in their surrounding conditions, or to causes of which we can learn nothing from their embryological history. That some active influences, even in the waters of the sea, have been present, is shown by the fact that many of the molluscan larva when hatched have an embryonic shell, others have not; and in the case of some Pteropoda, the larva possesses an embryonic shell, a secondary shell being added during larval life. While in the free-swimming larval condition the animal would be very easily influenced by both animate and inanimate surroundings.

Having now briefly reviewed the physiological and embryological characters of the molluscan shell, what do we learn from them with regard to the question as to their origin. It has been remarked that the first appearance of the embryological shell is preceded by a chitinous plug, and that in the formation of the shell proper of the adult animal, the chitinous epidermis or periostracum is first formed. As the oldest or earliest developmental animal characters are the first to make their appearance, it may reasonably be argued that the earliest covering, protective or otherwise, was a simple external chitinous covering, which has during a long period of time become modified into the varied forms belonging to the mollusca.

The next character in order of formation in the adult shell is the prismatic layer, which has been shown to be the crystalline form of aragonite, or carbonate of lime. This may originally have been formed by the secretion of more or less numerous small crystals of carbonate of lime—as in some modern Tunicates, which have scattered through their outer covering small spiculæ of carbonate of lime—which, by becoming more numerous, would form a thin prismatic layer. This deposition of crystals may have been caused in the first instances by an undue amount of the calcic carbonate in their food, which could not be properly excreted or carried away by the usual methods, consequently would be circulated through the body, and become secreted on the outer parts of the animal.

As the small crystals would be unable to pass through the original chitinous epidermis, they would thus naturally aggregate together upon its inner side. The nacreous layer being the last formed, is probably a later development of the secretive power of the animal.

Upon this view, the periostracum is the original covering, and the carbonate of lime shell a secretory product made use of by the animal, a service that has been transmitted down to generations with cumulative developments and adaptations from early geological times to the present. We have here a possible explanation of the presence of a periostracum and shell to the mollusca. It is, however, simply a suggestion borne out in some measure by the developmental history of the animal.

Geological evidence would also appear to favour my views. Even in the earliest-known Cambrian seas it would seem we are far from the commencement of molluscan life, and that they had undergone many changes previous to this period. The complete differentiation which the mollusca had already attained at that time argues for a much greater antiquity for them than this period. Genera and species of the *Lamellibranchiata* and *Gastropoda* do not occur until the Tremadoc Slate beds, and it is noteworthy they are few in number. Although no doubt the obliteration by metamorphism of organic remains has been excessive in the beds older than the Tremadoc Slates, other classes of animal life have been fairly well preserved. Possibly the non-presence of molluscan shells in these earlier beds is due to their non-possession of a shell sufficiently hard or solid enough to be preserved.

THE CONCHOLOGIST:

A QUARTERLY MAGAZINE FOR CONCHOLOGISTS.

"The Conchologist" is published on each quarter-day. Annual Subscription, 3s. 6d., post free. Single Copies, 10d. each.

All communications intended for publication, advertisements, and books, &c., intended for review, should be forwarded on or before the 1st of the month preceding publication, and addressed to

W. E. COLLINGE, *108, Woodsley Road, Leeds.*

MARCH 25TH, 1891.

Editor's Notes.

THE first number of *The Conchologist* appears at the expressed wish of a number of Conchologists, who require a medium for the interchange of thought and the promotion of their interests. It was originally our intention to produce a similar paper to *The Nautilus*, and if it received sufficient support, to issue the same monthly. Our number of subscribers having far exceeded what we anticipated, we have produced a much better and larger paper; and if the same support is accorded to us at the year end, *The Conchologist* for 1892 will be issued as a bi-monthly. To those who have given us their hearty support, and for their good wishes, we desire to express our thanks.

WE are indebted to a number of our supporters for various suggestions as to our paper, some of which will be acted upon in future numbers. We have the pleasing duty of here acknowledging the receipt of a number of photographs from various conchologists, a list of which will appear in the June number.

A CORRESPONDENT writes enquiring if our paper is the organ of any society, and if we will devote a page in each issue to the reports of Conchological societies. We beg to inform him and our readers that our paper is connected with no society, nor is it our intention of letting it become so. We shall, however, always be pleased to receive reports of societies, and, as far as it lies within our power, to assist in any way in the formation of such, believing, as we do, that

if well regulated and worked on practical lines they are capable of being made centres of great usefulness and interest.

THE only two Conchological societies we are aware of are the Conchological Society of Great Britain and Ireland, and the Manchester Conchological Society, which is affiliated with the former. If others exist we shall be pleased to hear of them.

WE understand it is the intention of the Council of the Conchological Society of Great Britain and Ireland to issue very shortly a new list of British Land and Freshwater Mollusca. The Committee into whose hands this important undertaking has been entrusted, are Messrs. J. W. Taylor, F.L.S., Wm. Nelson, and W. Denison Roebuck, F.L.S. While no one for a moment can question the ability or qualifications these gentlemen possess for such a piece of work, a much larger committee would, in our opinion, have ensured a better list. A list of Land, Freshwater and Marine Mollusca compiled by the following gentlemen is what is required:—T. D. A. Cockerell; the Rev. A. H. Cooke, M.A., F.L.S.; W. E. Hoyle, M.A., M.R.C.S., F.R.S.E.; J. T. Marshall; J. Cosmo Melvill, M.A., F.L.S.; William Nelson; the Rev. Canon Norman, M.A., D.C.L., F.R.S.; W. Denison Roebuck, F.L.S.; Edgar A. Smith, F.Z.S.; A. Somerville, B.Sc., F.L.S.; John W. Taylor, F.L.S.; and the Rev. R. Boog Watson, B.A., F.R.S.E., F.L.S.

WE are pleased to welcome an old friend in a somewhat new guise—*The British Naturalist*—in which our readers will find a Conchological section under the able editorship of Mr. T. D. A. Cockerell.

ON THE SYNONYMY OF THE SO-CALLED LIMAX ARBORUM AND AMALIA MARGINATA.

W. E. COLLINGE,

Hon. Librarian and Assistant Curator to the Conchological Society of Great Britain and Ireland.

I HAVE lately had some correspondence with Mr. T. D. A. Cockerell with reference to the above, and as the matter does not seem to be clearly understood by all conchologists, I have undertaken, at Mr. Cockerell's suggestion to place it in a little clearer light than it has hitherto occupied.

Limax marginatus, Müller.

= *Limax marginatus*, Müller, 1774.

= *Limax arborum*, Bouch.-Ch., 1838.

The form which we now term *L. arborum*, is, in my opinion, identical with the *L. marginatus* of Müller, a view which Mr. Cockerell also takes. Of course this has nothing to do with the *L. marginatus* of Drap., or the one of British Authors, they both being *Amalia* as shown below. The *Limax sylvestris*, Scopoli, 1772, is also referable to Müller's form, Mr. Cockerell thinks, but his description is too poor to admit of certainty.

Amalia marginata, Drap.

= *Limax marginatus*, Drap.

This species is not a British form, although it has been figured and described by English authors.

Amalia Sowerbyi, Fér.

= *Amalia carinata*, Leach.

= *Limax marginatus*, Auctt. Britt.

= *Amalia marginata*, Roebuck, &c.

There seems to be little doubt but that Férussac's name must here have priority, although that of Leach's is certainly anterior by three years. But from the fact that Leach's work was, although printed, only privately circulated amongst his friends, and not actually for sale to the public until long after, it is only fair that the former title should be acknowledged.

From the above remarks it will be seen that the two forms we have in Great Britain are—

Limax marginatus, Müll.

= *L. arborum*, Bouch.-Ch., and

Amalia Sowerbyi, Fér.

= *L. marginatus*, and *Amalia marginata*, Auctt. Britt.

Much confusion has been caused in the past, and it is to be hoped that for the future conchologists will acknowledge priority in these matters.

NEW SHELLS FROM SOUTHPORT.

By J. W. WILLIAMS.

Dr. G. W. Chaster has forwarded me some shells from Southport for the purpose of notification, and these, as far as I am aware, have not hitherto been recorded for South Lancashire. They are:—

Amalia marginata, Müll., which were found on the banks of the Leeds and Liverpool Canal, close to the bridge at Lydiate.

Hyalinia alliaria, Müll., which are described as "fairly common among grass" on cops (a cop being a steep bank used to enclose fields), near Hesketh Woods, and also on Birkdale sand-hills. To these, Dr. Chaster says his attention was "first attracted by the alliaceous smell."

Hyalinia excavata, Müll. Among grass and stones (two specimens were found) on the road-side between Ormskirk and Halsall. One specimen was also taken from under some stones in a wood at the base of Parbold Beacon.

Helix aspersa, Müll. This shell is not mentioned in the revised census of the Conchological Society as having been yet seen from South Lancashire by the referees. Dr. Chaster, in enclosing specimens, says that they are found "abundantly among grass and nettles, and on willows, near Hesketh Wood. Also, in a garden in York Road, Birkdale, where they have probably been recently introduced."

Helix virgata, Da Costa. Among grass, in Meols Cop Road, where, Dr. Chaster was informed, it had been found for the last ten or twelve years. On ground enclosed by the New Promenade, "where it has almost certainly been recently introduced." The specimens from this last locality, as submitted to me, include Moquin's var. *lutescens*. "The shells from the two localities differ distinctly in size and colouration, especially when quantities are compared. The places are about two miles apart."

Helix pygmæa, Drap. Plentifully among grass on the cops around a small area of ground in the midst of Birkdale sand-hills. At Hesketh Woods, Scarisbrick, Rufford, and Bispham. "A bagful of grass (two or three quarts)," says Dr. Chaster, will yield, from the first-named locality, "thirty to fifty specimens."

Vertigo pygmæa, Drap. Associated with *H. pygmæa*, on the cops in the middle of Birkdale sand-hills.

Pupa marginata, Drap. Abundant at the roots of starr grass, on Birkdale sand-hills.

The quotations indicated by inverted commas are from Dr. Chaster's letter to the writer.

THE LAND AND FRESHWATER MOLLUSCA OF OXFORDSHIRE.

By W. E. COLLINGE.

But few works have been written on the Molluscan Fauna of the different counties in Great Britain and Ireland. Numerous local lists of Oxford have been published, but from the fact that they have appeared in various scientific periodicals, and at different times, their value is to some extent decreased by their necessarily uncollected and inaccessible form. I have been induced to put together the following pages, partly by the want I have felt myself, during the years my attention has been devoted to Oxfordshire Mollusca, and partly with the hope of presenting to the conchologist and naturalist, new matter relating to the subject, and a concise and handy means of reference to the molluscan fauna of the county. Failing any recognised divisions of the county, I have termed the eight different centres I have worked from "districts," except where the records are but few or rare I have not given them in detail.

To the many correspondents (to whom my thanks are equally due, but too numerous to mention individually) from whom I have received much valuable information, I tender my warmest thanks. To Messrs. O. V. Aplin, M.B.O.U., T. D. A. Cockerell, the Rev. S. Spencer Pearce, M.A., William Nelson, W. Denison Roebuck, F.L.S., and J. W. Williams, I am much indebted for their advice, records, lists, examination of critical forms, and other services which they have so generously placed at my disposal.

At the conclusion of this list I shall give a brief review of the physical features of the county, the bibliography, &c.

List of Districts.

1. Banbury.
2. Chipping Norton.
3. Wychwood and Charlbury.
4. Deddington.
5. Bicester.
6. Oxford.
7. Swincomb.
8. Henley.

TESTACELLA, Cuvier.

Testacella haliotidæ, Drap.

This is not at all uncommon, but is seldom seen above ground. I have met with them at a depth of from four to five feet, as well as nearer the surface.

Testacella scutulum, Sby.

I find a record for this species in my papers as occurring near Oxford, in 1887. I have not since met with it, and I am now inclined to think that these specimens were *T. haliotidæ*.

LIMAX, L.

Limax maximus, L.

= *L. cinereus*, Müll.

This, the largest of the Limaces, is very plentiful throughout the county, occurring profusely in all the eight districts.

Var. cellarius, D.'Arg.

In Norman's list for 1853, the occurrence of a variety in which the shield is "spotted with black, and the back marked with longitudinal lines" is recorded, which, I think, may be referred to this form.

7. Swincomb.—"Not uncommon on the hedge-banks of the Henley Road, from half-a-mile to a mile from Watlington" (Norman, 1853).

Limax marginatus, Müll.

= *L. arborum*, B.-Ch.

This species, which is fairly common in suitable localities, is generally found upon beech trees. Although I have never witnessed this slug raise and lower itself by means of its slime, it undoubtedly does so, for on moist damp days, long glistening threads, from six to eight inches in length, may be seen hanging from the branches of the beech trees. Mr. Wm. Harte, F.R.G.S.I., who has paid some attention to the spinning habits of this slug, has caused them to spin threads, and to re-ascend by them, and, judging from the "perfect ease and regularity with which they do it," he is of opinion "that they are well accustomed to it." If gorged with food, he states, "the slime is thin and unable to sustain the slug, but if kept overnight without food they perform well next morning,* which I have found to be the case with other species.

1. Banbury.—Not of frequent occurrence.
2. Chipping Norton.—Fairly common.
3. Wychwood and Charlbury.—Plentiful on the beech trees.
6. Oxford.—Plentiful.
7. Swincomb.—Very common.

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* Proc. Dub. Nat. Hist. Soc., Vol. IV., pt. ii.

Limax variegatus, Drap.

= *L. flavus*, Auctt.

An exceedingly common and abundant form occurring in all the eight districts.

Var. **suffusus**, Roeb.

3. Wychwood and Charlbury.—Rare; found between Charlbury and Stonesfield.

Var. **lineolatus**, Collinge.

"Animal a very light yellow, ashy grey on the keel; tentacles yellowish; each side of the body striped with a dark brown line, commencing faintly near the tentacles and converging on the keel; foot pale yellow. I am not aware of any previous record of such a variety as the above, banded forms of *flavus* being, I believe, very rare. Mr. T. D. A. Cockerell informs me that *Limax calendymus*, Bourg., from Madeira—which he thinks is probably a variety of *L. flavus*,—exhibits an arrangement of the markings approaching banding, but is distinct from *lineolatus*."

1. Banbury.—Hedge bottom, Neithorp; and garden, Banbury.

Agriolimax agrestis, L.

Probably the most abundant species of the *Limacidæ* in the county. It is well distributed, occurring in all the eight districts in great numbers.

Müller describes this slug as "shy," and states "that if touched it will withdraw its tentacles and lie as if dead for a whole day." My observations do not at all agree with these statements. I have found it exceedingly active, and the tentacles are almost immediately protruded again after touching. Rimmer says a specimen he had was "exceedingly lively, and, when touched, instantly protruded its tentacles, extended its body, and crawled along rather rapidly."

Var. **albidus**, Picard.

4. Deddington.—Single specimen.

Agriolimax lævis, Müll.

This active and interesting slug is a somewhat uncommon form, and is never met with in any large numbers. It frequents damp and wet places, and requires carefully looking for.

1. Banbury.—In dead leaves by Broughton Castle.
2. Chipping Norton.—Few under logs of wood.
3. Wychwood and Charlbury.—Met with sparingly, near Charlbury.

6. Oxford.—Fairly common.
7. Swincomb.—Occasionally met with.

Amalia gagates, Drap.

This is not at all a common form, being somewhat local, and confined to the Northern divisions of the county.

1. Banbury.—Met with sparingly, near Little Bourton.
2. Chipping Norton.—Two specimens near Lidstone.

Var. rava, Williams.

I have met with a variety which agrees with the description of this form, viz.: "animal drab coloured, slightly fuscous, with the mantle of a lighter colour than the back."

1. Banbury.—Near Little Bourton.

Amalia sowerbyi, Fér.

= *A. carinata*, Leach.

Not an uncommon form, but never met with in large numbers.

1. Banbury.—Broughton.
2. Chipping Norton.—In two gardens at Kingham (S. Spencer Pearce).
5. Bicester.—Weston-on-the-green, Rev. A. Matthews (Norman, 1857).
7. Swincomb.—Few, near Swincomb.

ARION, Fér.

Arion ater, L.

This fine slug is found in great abundance throughout the county. Some specimens I collected near Bodicot were covered to an unusual extent with the small white parasites, *Philodromus limacum*, Jenyns. Simroth has pointed out that slugs of a red colour are rejected by birds, &c., or only the viscera eaten, I have noticed that the variety *rufus* Linné. of this species is seldom if ever eaten by birds. A very erroneous idea is prevalent amongst Naturalists in general that slugs and snails are exclusively herbivorous; judging from my experiments on this and other species I am of opinion that they will eat almost anything, as has, since my observations, been shown to be the case.*

Var. rufus, Linné.

1. Banbury.—Often met with, Banbury, Bloxham, and Broughton.

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* H. Wallis Kew, F.E.S., "Naturalist," April, 1889, p. 103.

6. Oxford, Woodeaton, &c.—The Rev. S. Spencer Pearce, B.A., records "a handsome dark brown variety in the Kimmeridge Clay-pits, at Shotover hills," which I think may be referred to this variety.
7. Swincomb.—Not uncommon.

Arion subfuscus, Drap.

A plentiful and well-distributed species, varying much in colour, the specimens in the southern parts of the county being generally much lighter.

Arion hortensis, Fér.

A common form throughout the county. A very lazy and inactive species.

Var. **rufescens**, Moq.

1. Banbury.—Met with on several occasions.
4. Bicester.—Two specimens.

Arion circumscriptus, Johnston.

= *A. bourguignati*, Mabille.

A not uncommon form, though I have but few records. Mr. W. Denison Roebuck, F.L.S., has on more than one occasion called attention to the fact that this species occurs in open fields and open country, rather than in woods and gardens like the other members of this genus, which I have found to be the case in this county. I have records from all divisions except 3 and 8.

SUCCINEA, Drap.

Succinea putris, L.

This mollusc, which is well distributed throughout the county, is never met with in any large numbers, and as usual, in marshy places.

Succinea pfeifferi, Rossm.

Comparatively rare. It is recorded as rare at Oxford by Norman in the 1853 list. The form that occurs there is the variety *rufescens*, Cockerell—a reddish shell and shallow suture. Whiteaves (1857) speaking of this shell as a variety of *S. putris*, says it is very plentiful.

1. Banbury.—Stretch (1855). Rare; few near Broughton Castle.
6. Oxford.—Rare, in a ditch running along the side of Cowley Marsh (Norman, 1853). Very plentiful (Whiteaves, 1857).

Var. **pallida**, Moq.

6. Oxford.—Very plentiful (Whiteaves, 1857).

Var. **rufescens**, Cockerell.

6. Oxford.—Rare, in ditches.

Succinea elegans, Risso.

I have only two records for this pretty shell. In 1887 I collected three specimens on the banks of the Churwell, near Banbury, and in the same year I obtained four or five from Oxford.

VITRINA, Drap.

Vitrina pellucida, Müll.

This beautiful mollusc is a common and well-distributed form in the county. In Norman's list of 1853, it is recorded as "very rare" in the Oxford district, a statement which cannot at all hold good to-day, as it is as common there now as elsewhere.

As I elsewhere stated, this mollusc is much more plentiful in the winter months than in the summer. "Gray observed that *V. pellucida* possesses the power of jumping an inch or two from the ground. I have observed that when crawling on the edge of some stone or leafless twig, it will sometimes suddenly give its tail a jerk, sufficient to throw shell and owner to the ground, where it is soon lost to sight amongst surrounding vegetation, at other times it will roll away a few inches and repeat the jumping motion. Another means of protection it possesses is that of attaching to itself bits of leaves or soil, which entirely cover the shell and animal, thus causing it to resemble the natural surroundings."*

HYALINA, Fér.

Hyalina draparnaldi, Beck.

Occasionally met with, but rare. I am informed that it has been found near Oxford, but have not seen the specimens. Norman, in his list of 1853, recorded what he thought to be a variety of *Hy. radiatula* taken in Magdalen Walks, which I think may possibly have been this species.

7. Swincomb.—Three specimens near Swincomb.

Hyalina cellaria, Müll.

A very common and plentiful species, occurring profusely throughout the county.

(*To be continued.*)

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* Obs. on *V. pellucida*. Zool., p. 467. 1890.

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Annals and Magazine of Natural History.

JANUARY.

Notes on Slugs, chiefly in the Collection at the British Museum.—T. D. A. Cockerell.

Notes on Some Shells received by the British Museum.—Edgar A. Smith, F.Z.S.

FEBRUARY.

Critical Notes on the Genus *Tebenophorus* and the recent Literature relating to it. —Henry A. Pilsbry.

MARCH.

Lepton squamosum (Montagu) a Commensal.—Rev. Canon Norman, M.A., D.C.L., F.R.S., &c.

The Genus *Limacella*.—T. D. A. Cockerell.

Mr. T. D. A. Cockerell continues his valuable notes on the Slugs in the British Museum.

Mr. Edgar A. Smith records a series of Shells received from Mr. John Brazier, of Sydney.

Mr. Henry A. Pilsbry, writing on the genus *Tebenophorus*, points out that if the present generic name has to be altered (as it has been by Cockerell (Ann. and Mag. of Nat. Hist., p. 381, 1891) to *Limacella*, Blainville) it must be to *Philomycus* Rafinesque, which has been adopted by continental authorities, it having priority over *Meghimatium*, Hasselt. In the author's opinion, *Eumelus*, Rafinesque, and *Limacella*, Blainville, are not at all applicable.

Canon Norman contributes a most interesting article upon the occurrence of *Lepton squamosum*, Montagu, at Salcombe, Devonshire, where he found it in 1875. It was previously recorded by Alder from this locality, and has also been found at Exmouth by Clark. It was found in the burrows of *Gebia stellata*, which were lined with a slimy deposit, upon which possibly the *Lepton* may feed?

British Naturalist.

JANUARY.

To Conchologists.—T. D. A. Cockerell.

Notes on *Helix nemoralis* and *H. hortensis*.—Rev. J. W. Horsley, M.A.

Sub-fossil Shells.—George Roberts.

Bibliography.—T. D. A. Cockerell.

Arion circumscriptus, Johnston.—T. D. A. Cockerell.

FEBRUARY.

Bibliography.—T. D. A. Cockerell.

Shells near Doncaster.—George Roberts.

MARCH.

Bibliography.—T. D. A. Cockerell.

Mr. Cockerell (Bibliography) very timely calls attention to the fact that in the "Proceedings of the Conchological Society of Great Britain and Ireland," varieties of molluscs not hitherto recognised in Britain are occasionally mentioned, but no descriptions are given. He also points out two important changes in the nomenclature, the first being that of *Arion minimus*, Simroth, lately described by Dr. Scharff as a British slug which is identical with *A. intermedius*, Norm., by which name it must of course be known. The second is that of *Arion bourguignati*, Mabille, named in 1868; this is synonymous with the *Arion circumscriptus*, Johnston, described in 1828, and consequently claims priority. A paper by the Rev. J. W. Horsley, M.A., is well worth reading.

In the Bibliography for February, Mr. Cockerell gives a very useful review of the Land Mollusca, mentioned in Westerlund's great work (*Fauna der in der Palaärctischen Region, lebenden Binnenconchylien*). The Freshwater genera are similarly reviewed in the March number. The system adopted by continental authorities in regarding many of the forms distinct species which we in this country only look upon as varieties, is one which is both unscientific and mischievous, and we are pleased to know that this is disapproved of by Mr. Cockerell.

Journal of Conchology.

JANUARY.

The Variation of *Limnæa peregra*.—J. W. Taylor, F.L.S.
Proceedings of the Conchological Society of Great Britain and Ireland.

Mr. Taylor concludes his interesting paper dealing with the variation of *L. peregra*. Adopting as the type that considered by Jeffreys as typical, the various varieties in the author's collection are dealt with under three sections—viz., "A. Spire short and aperture exceeding three-fourths of the total length of the shell; B. Spire produced, aperture not exceeding three-fourths of the total length of the shell; C. Modifications other than those of form or outline, and which exist only in combination with form variation." The paper enumerates twenty-nine variations, and endeavours to some extent to reduce the excessive number of some of the more specialised forms.

Naturalist.

MARCH.

Observations on the Burrowing Habits of Certain Land and Freshwater Mollusca. —W. E. Collinge.

Naturalists' Gazette.

JANUARY.

Observations on *Helix pomatia*.—E. W. Swanton.

Science Gossip.

JANUARY.

Notes concerning the Distribution of Mollusca in the Thames Estuary.—A. J. Jenkins and L. O. Grocock.
Shells in Banffshire.—J. C. Smith.

FEBRUARY.

The Colours of Shells.—J. W. Williams.

Messrs. Jenkins and Grocock contribute a most complete and interesting account of the Mollusca inhabiting the marshes of the Thames Estuary.

Zoologist.

JANUARY.

A New Locality for *Geomalacus maculosus*.—Reginald W. Scully.

All conchologists will be pleased to hear of a new locality for *G. maculosus*, which Mr. Scully records from Co. Kerry, some twenty miles from Caragh Lake, the original locality.

*** *We hope in future numbers to make this department much more complete, and to incorporate the titles of all articles, &c., relating to Conchology from all the principal English and Foreign Magazines; to this end we ask the hearty co-operation of our readers, and especially that of the Secretaries of Scientific Societies for copies of Transactions containing Conchological articles or reports.*

REVIEWS.

A List of Mollusca and Other Forms of Marine Life collected in Japan. By Frederick Stearns. Detroit: John F. Eby & Co.

This is a very useful list of a valuable collection made by the author in 1889-90, which contains 72 named species not found in *Dunker's Index Molluscorum Maris Japonici* and there remains 32 species yet undetermined, besides a large number of varieties. The list contains figures of *Scalpellum stearnsii*, Pilsbry, *Terebratella gouldii*, Dall., and *T. stearnsii*, Dall. and Pilsbry.

Label Lists of British Marine and Land and Freshwater Shells. Birmingham: The Naturalists' Publishing Co.

To all conchologists who require either label or exchange lists we recommend the above. They are well printed on good paper, and may be had at a very small cost.

NOTES AND QUERIES.

Literature on the Genus Vitrina.—I should feel much obliged to any conchologist for any references to English or Foreign literature upon this genus.—J. R. Neal.

Cæcilianella acicula in West Kent.—Mr. J. R. Longhurst has forwarded me some specimens of this pretty little shell which were collected round Sittingbourne, out of a bag of dust. He says he picked out about seventy, so that in this locality it seems to be very abundant. I think that this is the first time this shell has been recorded for this county west of the Medway.—J. W. Williams.

A New Variety of Helix Cantiana in West Kent.—Mr. J. R. Longhurst has sent me a variety of *Helix cantiana*, which he found dead near Sittingbourne, and which is interesting, since, as far as I am aware, it is new, and its varietal characteristics are well marked. If I am correct in my surmise as to this specimen being new, I would call it var. *elevata*. The description runs thus:—Shell smaller than type, with the whorls of the spire; compressed as in type, but bodily raised from the body-whorl as a daïs from the floor; as a consequence of this elevation, the suture between the body-whorl and the whorl next to it, is deep and canaliculata, and the greater portion of this last-named whorl is not hidden as in type, but rises for three-fourths of its length above the body-whorl. Thus, at the very first look, one would think it to be a sub-scalarid monstrosity. The shell measures in length 8·5 mm., and in breadth 12 mm.—J. W. Williams.

ANSWERS TO CORRESPONDENTS.

All communications intended for publication must be authenticated with name and address of sender.

A. R. B.—The matter shall have our attention.

J. M.—Yes. Mr. R. Standen is the Hon. Secretary of the Manchester Conchological Society.

J. R. Neal.—Consult Wesley's Book Circulars or Collins' Catalogues.

Dundee.—No, we cannot undertake to name collections of shells.

Honorary Secretary.—Your letter bears no address whatever. If you still think of founding a Society we shall be pleased on receipt of stamped and addressed envelope to send you the names of those conchologists we know in the neighbourhood.

A. R. B.—Mr. Damon will be able to supply you with almost any foreign shells you desire.

THE CONCHOLOGIST:

A Quarterly Magazine for Conchologists.

Vol. I. JUNE 24th, 1891. No. 2.

NOTE ON THE LOCALITY OF HELIX MANDARINA, *Gray.*

By EDGAR A. SMITH, F.Z.S.

This well-known species was described by Dr. Gray,* from specimens obtained by Captain F. W. Beechey's expedition to the Pacific, during the years 1825 to 1828. The locality given by Gray, I am inclined to believe erroneous. It has never been confirmed, but, at the same time I should observe, no other locality has been assigned to this shell. In 1889, Mr. Yokoyama, of the Tokio University, Japan, presented a specimen to the British Museum, which he said was collected at the Bonin or Arzobispo Islands, as they are also called. Later on in that year, the Museum received a second example from the same locality, and a third specimen, the largest I have seen, has just been obtained from Mr. Holst, who collected it himself on these islands.

On turning to Captain Beechey's work,† I find that, after leaving Macao in China, the "Blossom" proceeded to the Loo Choo Islands, thence to the Bonin Islands, Kamtschatka, and Behring Straits. I think, therefore, there is every probability that Captain Beechey's specimens were obtained at the Bonin Islands, seeing that the expedition visited there, and not at Loo Choo as originally supposed.

The variability of this shell in form has been remarked upon by Gray and Pfeiffer, but no reference has been made to any variation in colour. The normal form is of a rich reddish-brown colour, encircled with a pale zone at the periphery. In some specimens the ground colour is lighter, and the pale zone at the periphery

* Zool., Beechey's Voyage, p. 143, pl. 34, f. 2; pl. 38, f. 3.

† Narrative of a Voyage to the Pacific, in H.M.S. "Blossom," 1825-8, Vol. ii., p. 228.

is replaced by one or more bright red bands. Two specimens in the Museum, both of which have been occupied by Paguri, are peculiar in having a pale roughish ridge on the base of the body-whorl surrounding the umbilical region. It has the appearance of being the result of an injury or disease; still its occurrence in two out of nine specimens is remarkable.

Figures of this species, besides that already referred to in Gray's work, have appeared in "*Reeve's Conchologia Iconica*," Vol. vii., pl. 76, f. 401, and in the "*Conchylien-Cabinet*," ed. 2, *Helix*, pl. 140, f. 15-16.

THE GLACIAL PERIOD AND BRITISH NON-MARINE MOLLUSCA.

By H. E. QUILTER.

WHATEVER may have been the cause of the gradual climatic refrigeration which culminated in the last geological period, called the Glacial Period, there is abundant evidence that such an event really did take place. The evidence would appear to show that physiographical changes were induced, bringing on a boreal condition of the surrounding seas, and a severely cold climate on land. It would seem that it was the peculiar climatal conditions of this Quaternary period that led in the main to the present distribution of the existing faunas and floras in Great Britain. We have long been conversant with the effect of this gradual alteration of climate upon the vertebrate fauna, but not until recently were we fully cognisant of its effect upon the land and freshwater mollusca, which inhabited this part of the Continent before Great Britain became an island.

The evidences show that during the Glacial Period, where the English Channel and the German Ocean are now present, there were thickly wooded inland valleys, irrigated by large freshwater rivers, among which the present river Thames played an important part. In the sands and gravels deposited by this river at that time, are found the remains of land and freshwater mollusca then inhabiting the area which the river drained. Mr. B. B. Woodward* has fully worked out the molluscan fauna from these beds in one district, and Mrs. McKenny Hughes† in another district.

* On the Pleistocene (Non-Marine) Mollusca of the London District. By B. B. Woodward, F.G.S., F.R.M.S., &c., Proc. Geol. Assoc., Vol. xi., No. 8.

Note on the Pleistocene Land and Freshwater Mollusca from the Barnwell Gravels. By B. B. Woodward, F.G.S., Proc. Geol. Assoc., Vol. x., No. 7.

† On the Mollusca of the Pleistocene Gravels in the Neighbourhood of Cambridge. By Mrs. McKenny Hughes, Geol. Mag., May, 1888.

The results of their work show that, while on the whole our present land and freshwater mollusca were then existing, there were a few species not now living in Great Britain. These extinct species are:—

Helix ruderata, Stud. This form has a wide continental range at the present time.

Helix fruticum, Müll. Is found all over Europe, with the exception of Great Britain.

Clausilia pumila, Ziegl. Is found in most parts of Germany, but more common in the north.

Hydrobia marginata, Mich.

Unio littoralis, Lam. Found in nearly all the rivers of France.

Corbicula fluminalis, Müll. This species lives at the present time in the rivers of Asia Minor and Syria, and the Nile.

Pisidium astartoides, Sandb.

With the exception of *Unio littoralis* and *Corbicula fluminalis*, it is difficult to account in a satisfactory manner for their extinction in the British area. The former is apparently a more southern form, and the Arctic climate of the Glacial Period would not be favourable to its existence. *C. fluminalis* is also a southern form, and Mr. Woodward notes with regard to it, that in the lower or older beds in which it is found, the specimens are typical, while in the newer beds they diminish gradually in size, and finally disappear. That the climatic conditions of the Glacial Period had a degenerative effect upon the mollusca, Mr. Woodward appears to think when he remarks:—"Speaking broadly, the Pleistocene Molluscan fauna appears to have been finer than the existing one,—and it really seems as if our non-marine mollusca had deteriorated both in size and number."

This, however, does not answer satisfactorily for the extinction in the British area of the species mentioned. There is some evidence that during the latter part of the Glacial Period a considerable portion of Great Britain was submerged to a depth of 2,000 feet, when only the highest mountain tops would be visible as rocky islets. This submergence would destroy the greater part, if not the whole, of the molluscan fauna existing on the area. Upon its subsequent elevation and union with the continent, the migration of, or dispersal of, continental forms into the British area would commence. From other evidence it would appear that sufficient time did not

elapse for the migration of a complete continental fauna before a subsidence again occurred, when the waters of the ocean intervened, cutting off the further influx of purely terrestrial life into the British area.

Would this view of the non-migration back again into this area account for the extinction of the seven species of non-marine mollusca enumerated?

THE LAND AND FRESHWATER MOLLUSCA OF OXFORDSHIRE.

By W. E. COLLINGE.

(*Continued from page* 21.)

Var. **albinos**, Moq.

4. Deddington.—Few specimens.
6. Oxford.—"Occasionally found with the ordinary form, Wytham Hill, and near Islip" (S. Spencer Pearce).

Hyalina glabra, Studer.

In Oxfordshire its distribution is by no means general.

5. Bicester.—Two or three specimens, 1887.
6. Oxford.—Recorded by the Rev. S. Spencer Pearce from Wick Copse and Woodeaton.
7. Swincomb.—Rare, sparingly met with.

Hyalina allaria, Müll.

A somewhat local form, but not at all rare.

1. Banbury.—Fairly common.
3. Wychwood and Charlbury.—Sparingly met with.
6. Oxford.—Commoner in this district than anywhere else.
8. Henley.—Mapledurham and Henley (Whiteaves, 1857).

Hyalina nitidula, Drap.

I have not been successful in finding this species in districts 4, 5, 7, or 8. Where it occurs I have generally found it plentiful. Small specimens of *Hy. cellarius* are, I have found, often apt to be mistaken for this species.

1. Banbury.—Plentiful.
2. Chipping Norton.—Occurs very plentifully.
3. Wychwood and Charlbury.—Ditto.
6. Oxford.—"Very rare on the Henley Road" (Norman, 1853).

Though not as common as in the more northerly districts, it cannot now be termed rare. I have over a dozen records where it is common.

Var. **nitens**, Mich.

6. Oxford.—"In a quarry of Portland sand on Shotover Hill, under loose stones" (S. Spencer Pearce).

Hyalina pura, Alder.

Not at all a common form, and only sparingly met with.

1. Banbury.—Broughton and Little Bourton.
2. Chipping Norton.—Few specimens.
6. Oxford.—Not at all plentiful, although occurring in a number of localities.

Hyalina radiatula, Alder.

Not an uncommon form.

1. Banbury.—Banbury (Stretch, 1855), Little Bourton.
6. Oxford.—Sparingly met with in a number of localities.
8. Henley.—Fairly common.

Hyalina nitida, Müll.

A well-distributed and common form, generally found five or six inches beneath the surface at the roots of grass, in moist places.

Hyalina crystallina, Müll.

This mollusc, possessing the most beautiful shell of any in this genus, is a common and well distributed form, occurring in all the eight districts.

Hyalina fulva, Müll.

Although sparingly distributed over most of the county, *Hy. fulva* cannot be described as common, and it is certainly not plentiful. A favourite habitat of this species is in decaying or rotten branches of trees and logs of wood.

HELIX, L.

Helix aculeata, Müll.

Generally found among beech and holly leaves. Though well distributed, it is not at all a common species. Often found coated with mud, &c., which makes it somewhat difficult to find.

Helix pomatia, L.

This species, formerly very plentiful in the district of Wychwood, Charlbury, and Stonesfield, is gradually becoming scarcer.

"A large colony of this snail is now thriving in the Botanic Gardens at Oxford, the descendants of specimens introduced from Stonesfield many years ago" (S. Spencer Pearce, 1883).

3. Wychwood and Charlbury.—Stonesfield (Norman, 1853). In a chalk-pit between Handborough and Stonesfield (Dalton, 1855), (Stretch, 1855). Found abundantly on the Great Oolite near Stonesfield, and in Wychwood Forest (Whiteaves, 1857). Charlbury (Pidgeon, 1875). Copses and woods at Stonesfield (S. Spencer Pearce, 1886).

Var. albida, Moq.

3. Wychwood and Charlbury.—In Wychwood Forest (Whiteaves, 1857).

Helix aspersa, Müll.

I have yet to discover the locality where this species does not flourish in abundance. It is a great pest to the market gardeners, and does much damage to their crops, nothing seeming to fall amiss to its voracious appetite. On the Oxford Road, near Banbury, there is a hedge of holly, upon which this species feeds, devouring not only the thick leaves, but the prickles also.* Some specimens collected near Oxford exhibited a peculiar notched appearance of the lip. Specimens in which the lines of growth are irregular are of frequent occurrence. The shells of those in the Southern districts are generally much thicker and stronger.

Var. conoidea, Picard.

6. Oxford.—Near Oxford (Mrs. M. E. Cusack).

Var. unicolor, Moq.

3. Wychwood and Charlbury.—One specimen in Wychwood Forest.

Var. cornucopia, Gmelin.

= *scalariformis*, J. W. Taylor.

I found a specimen approaching this variety near Deddington, and Whiteaves recorded one from Summertown, which is now in the Museum.

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* In *Nature*, No. 1061, Feb. 27th, 1890, p. 393, Mr. T. D. A. Cockerell mentions having found prickles in the stomach of *Parmacella*.

This variety, which has been re-named by Mr. J. W. Taylor *scalariformis*, has long been known to naturalists as the *Serpula cornucopia* of Gmelin, as has been previously pointed out by Mr. J. W. Williams and others. It is only fair, I think, that Gmelin's name should be re-instated.

Helix nemoralis, L.

As in most counties, *H. nemoralis* flourishes in Oxfordshire in extraordinary abundance and in great variety.

Var. rubella, Moq.

1. Banbury.—Uncommon.

Var. albinos, Moq.

7. Swincomb.—Recorded in Norman's list of 1853, from "hedge-banks, at the foot of Watlington Hill."

Var. sarratia.

6. Oxford.—Whiteaves records a variety under this name, as occurring in plantations on the Banbury road.

Helix hortensis, Müll.

Quite as common as the preceding species.

Helix arbustorum, L.

A common and well-distributed species, somewhat local. Jeffreys mentions (in Brit. Conch.) that he has in his cabinet a specimen from this county in which the spire is exceedingly raised.

Var. flavescens, Moq.

1. Banbury.—Not uncommon.
6. Oxford.—Hincksey hill (Whiteaves, 1857). "Not uncommon near South Hincksey and Radley" (S. Spencer Pearce, 1883).

Var. alpestris, Zgl.

6. Oxford.—Rare near South Hincksey (S. Spencer Pearce, 1883).

Var. major, Pfr.

6. Oxford.—Rare near South Hincksey (S. Spencer Pearce, 1883).

Var. roseo-labiata, Roberts.

2. Chipping Norton.—Not uncommon.

Helix cantiana, Mont.

Whiteaves recorded this species in 1857 as limited to the Headington district. It seems now, however, to have a general distribution over the county, as will be seen from the records below.

1. Banbury.—Broughton and Little Bourton.
2. Chipping Norton.—Uncommon.
3. Wychwood and Charlbury.—Charlbury on Great Oolite (Pidgeon, 1875). Stonesfield. Abundant on nettles (O. V. Aplin, 1882).
4. Deddington.—Common near Deddington, 1888.
6. Oxford.—"Abundant but local; Headington and Shotover Hill" (Norman, 1853). "Very local, Headington, Cheney Lane and on Cowley Marsh" (Whiteaves, 1857). Recorded from numerous localities in Pearce's 1883 list.
7. Swincomb.—Abundant.

Helix rufescens, Penn.

A common and well distributed species, occurring in large numbers in all the districts.

Var. alba, Moq.

6. Oxford.—"In Worcester College Gardens" (Dalton, 1855). "Rather scarce" (Whiteaves, 1857). "Common" (S. Spencer Pearce, 1883).

Var. depressa, Loc.

1. Banbury.—"On an old wall outside the village of Adderbury, near Banbury (S. Spencer Pearce, 1883).

Helix hispida, L.

Common throughout the county.

Var. depilata, Alder.

6. Oxford.—"Near Wytham" (Whiteaves, 1857).

Var. albida, Jeff.

3. Wychwood and Charlbury.—Under stones at Stonesfield (S. Spencer Pearce, 1883).
6. Oxford.—Islip (S. Spencer Pearce, 1883).

Var. **concinna**, Jeff.

As common as the type in all districts.

Var. **minor**, Jeff.

Occurs plentifully in districts 3, 6, and 7.

Helix granulata, Alder.

= *sericea*, Auctt.

This species is recorded by Whiteaves (1857) from marshy ground at the foot of Ballingdon. Since then it does not seem to have fallen to the lot of any collector, and I was almost of opinion that it was extinct in the county, until I found three specimens at Little Bourton, in district 1, last year (1890). There is no doubt but that this species is rare in Oxfordshire, but I think if carefully sought for it will be found in other localities.

Helix fusca, Mont.

Rare, and confined to the northern district.

1. Banbury.—Broughton, 1887.
2. Chipping Norton.—Near Chipping Norton, 1887.
4. Deddington.—This record is doubtful. I have three specimens labelled *H. fusca*, 1888, which, I think, were collected near Deddington.

Helix pisana, Müll.

It is with some amount of diffidence that I include this species amongst the mollusca of Oxfordshire. Its only claim lies on the occurrence of a single specimen, which was found near Charlbury in 1887. Until other occurrences are recorded I can only look upon it as introduced.

Helix virgata, Da Costa.

A common and well-distributed form. On the limestone the shells are much larger and stronger. It is very common on the limestone in the west of the county, Mr. O. V. Aplin informs me.

Helix caperata, Montagu.

A somewhat local form and not common.

1. Banbury.—(Stretch, 1855). Recorded in Pidgeon's List, in 1875, as "very scarce." Rare near Broughton.
3. Wychwood and Charlbury.—Stonesfield.

6. Oxford. — Bullingdon and Headington (Norman, 1853). (Dalton, 1855). Plentiful; in meadows, &c. (S. Spencer Pearce, 1883).

Var. **ornata** Picard.

3. Wychwood and Charlbury.—Near Stonesfield. (S. Spencer Pearce, 1883).

Helix ericetorum, Müll.

Have not met with this species in any great abundance in any part of the county.

1. Banbury.—"Hill side near Wiggington Heath." (Stretch, 1855). Sparingly. (Pidgeon 1875).
4. Deddington.—Sparingly met with.
6. Oxford.—Not common. (Norman, 1855). (Dalton, 1855). (Whiteaves, 1857). Not plentiful; (S. Spencer Pearce, 1883).

Var. **alba**, Charp.

Not of common occurrence; recorded for District 6 in the Rev. S. Spencer Pearce's List, 1883.

Var. **minor**, Moq.

6. Oxford.—Recorded by the Rev. S. Spencer Pearce as rare on the Headington Road near Wheatley.

Helix rotundata, Müll.

Well distributed throughout the county and found in great abundance. In common with a number of other molluscs, this species is often met with six and seven inches beneath the surface in the burrows of earthworms.

Var. **alba**, Moq.

Dr. Jeffreys (B.C.) records this rare variety from Oxford.

Helix rupestris, Drap.

A very common species, though I have never met with it in any large numbers.

1. Banbury.—On old walls, beneath the moss.
2. Chipping Norton.—Fairly common.
5. Bicester.—Weston-on-the-Green, Rev. A. Matthews (Norman, 1875).
6. Oxford.—Common.

Helix pygmæa, Drap.

A rare and local form.

1. Banbury.—(Stretch, 1855). Two specimens near Little Bourton.

6. Oxford.—Woodeaton, rare (Dalton, 1855). (Norman, 1857). "Found but rarely, I have taken it on an old wall near Woodeaton, this is, I believe, of rare occurrence (Whiteaves, 1857).

Helix pulchella, Müll.

This species, one perhaps of the most beautiful of our land molluscs, is a fairly common one in Oxfordshire. I have records from all the districts.

Var. costata, Müll.

Very common and generally found with the type. The Rev. S. Spencer Pearce mentions it being the most common of the forms, and that he invariably found it in dry places, whereas the type he found in wet places.

Helix lapicida, L.

I have not been fortunate enough to meet with this species in this county. Though not rare it has only been sparingly met with, and is a local form.

3. Wychwood and Charlbury.—(Stretch, 1855). Sparingly at Charlbury, abundantly in the chalk near Goring (S. Spencer Pearce, 1883).

(To be continued.)

THE CONCHOLOGIST:

A QUARTERLY MAGAZINE FOR CONCHOLOGISTS.

"The Conchologist" is published on each quarter-day. Annual Subscription, 3s. 6d., post free. Single Copies, 10d. each.

All communications intended for publication, advertisements, and books, &c., intended for review, should be forwarded on or before the 1st of the month preceding publication, and addressed to

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JUNE 24th, 1891.

Editor's Notes.

IN presenting to our readers the second number of *The Conchologist* we take the opportunity of thanking them and the Press for the support received at their hands. For the many flattering notices given us by the latter, and the unanimous expression of approval from the former, we are much indebted.

WE have received during the past quarter a number of local lists of land and freshwater shells, which, if printed, would occupy nearly three numbers of our paper. Really good county lists may have a value, but compilations of the Mollusca to be found around every town and village are useless, or almost so. They certainly have no scientific value. To those gentlemen who have been good enough to forward these lists we have explained, in more detail, our views upon the matter, which, we are pleased to learn, they share. For obvious reasons we shall publish no further lists.

MR. T. D. A. COCKERELL has lately been appointed Curator of the Museum of the Institute of Jamaica. Few conchologists, in recent years, have done so much to further the interests of Conchology, and added so largely to our knowledge of the Mollusca, as has Mr. Cockerell. His valuable assistance has always been most generously placed at the disposal of his numerous correspondents, and many—ourselves not the least—will feel the loss occasioned by his removal.

A LIST of the Land and Freshwater Mollusca of Suffolk, compiled by the Rev. Carleton Greene, M.A., will shortly be issued by the Suffolk Institute of Natural History and Archæology.

THE variety *minor*, Taylor, of *Limnæa palustris*, which some little time ago was re-named *nana* by Mr. Cockerell—owing to the term *minor* having been previously used by Locard for a rather different variety than that of Mr. Taylor's—seems to be identical with Baudon's variety *minima*, by which term it will for the future be known. (See *Biblio. Brit. Nat.*)

IN the Proceedings of the Conchological Society of Great Britain and Ireland for April, we notice a note, headed "Photographs and Autographs of Conchologists," explaining that the Council would "be glad to receive photographs of all members of the Society, and conchologists generally, whether living or deceased; and if members or friends were disposed to present suitable albums, an additional obligation would be conferred. Examples of the autographs of all who have in any way contributed to the advancement of Conchological science are also desired." The collecting of photographs and autographs is hardly likely, we think, to add to the Society's prestige as a scientific body, or to its utility.

ADVENTITIOUS PROTECTION IN FRESHWATER MOLLUSCA.

BY C. CLARE FRYER.

THE persistence of the "primitive" horn colour in the *Limnæidæ*, and the simple dull greens and purples of the *Paludinidæ* and *Unionidæ* are doubtless due in great measure to the less competition that exists between freshwater forms and the consequent slower and less efficient action of natural selection on a more constant environment, but such colours are at the same time the best protection, assimilating to that of the muddy surroundings, for the prevalence of dull green and brown colours, doubtless due to the same cause, may be noticed in fresh-water insects.

Concealment is further enhanced by coatings or stains of mud, lime, &c., or growths of weed.

The *Unionidæ* vary greatly in colour, and very generally assimilate to that of their surroundings—thus those living in clear streams and rivers are light green and often "rayed"—whilst those in muddy ponds are darker (see Dr. Gould in Bost. Soc. Nat. Hist., vol. xiv.,

Ap. 5, 1871). Specimens from a stagnant pond near the Arch on Hampstead Heath, are of a very deep, almost black, olive green and live in rich black mud, at the upper end of the pond an iron-charged stream tinges the water and mud red, and the mollusca are similarly coated with red oxide of iron.

Sphærium corneum varies in colour in different waters. On the caked mud of a dry ditch at Childs Hill were numerous *Pisidium pusillum*, but very hard to distinguish owing to their coating of mud.

Paludina vivipara from the Thames at Marlow, living in comparatively clear water were light green and often bandless. Specimens from the Leg of Mutton pond at Hampstead are darker, have a greater development of purple, and frequently covered with confervæ. Dr. Gray notices of *Neritina fluviatilis* that "the shells are often covered with calcareous incrustations deposited by the waters, which makes them look like pieces of dirt, and thus escape being seized on by the fish," while in clear waters its chequered shell and spotted hind part of the foot may aid it in concealment among the fine pebbly sand of swift streams.

Limnæa stagnalis—a fine and old specimen living in a patch of conferva in a quiet bay of the Brent, at Whembley, was quite obscured by a particularly fine growth of the same weed, extending some inches beyond the shell, while it is notable that my other specimens from this stream are very thin, of small size and light in colour: two being the variety *albida*.

Limnæa peregra varies greatly in colour and texture, and always seems most admirably adapted to the surrounding conditions. When the shell is thin and light coloured, the dark bluish animal variegated with yellow spots and patches is visible through the body whorl, and owing to the irregular distribution of colours obscures the outline and assimilates to the muddy bottom.

This species sometimes dots the mud banks in great numbers from which the water has receded, and is in such a plight often coated with mud, and so to some extent protected.

A drain at the narrow end of the Leg of Mutton Pond is highly charged with oxide of iron which forms a deposit on everything in it including the few plants—there is no sheltering pond weed, and specimens of a dwarf form of *Limnæa peregra* abound—all thickly coated with red oxide of iron of so exactly the same colour and texture as the surrounding red mud as to be hardly distinguishable; in bright sunshine their presence is proclaimed by the long ruts or trails left as they actively plough their way through the yielding red mud; when touched the animals immediately retire into their shells and remain quite still.

In the Lathkiln, Derbyshire (a clear stream highly charged with carbonate of lime in solution), I observed a small form of *Limnæa peregra* roughly coated with this so as to be undistinguishable from the stony bottom where all else is similarly covered—a large specimen of the variety *labiata* living at the bottom of a hole made by a cow's hoof was enshrouded in conferva.

Planorbis contortus living among the rich black mud at the roots of flags in the Brent, at Neasden, is stained the same colour, although specimens from other parts of the stream are quite clean. *Planorbis complanatus* is sometimes encrusted with a close green conferva hard to remove.

Planorbis corneus—several large and old specimens covered with conferva in the Leg of Mutton Pond—others from this pond are tinged a rusty red with oxide of iron.

No doubt the presence of mud and growth of weed are favoured on these shells by their sluggish habits, but it is significant that all the conferva coated specimens I have found were large and old, and doubtless owed their longevity to its protection.

ON THE BURROWING HABITS OF THE GENUS TESTACELLA, CUVIER.

By C. D. HORSMAN, B.A.

Having been much interested in the observations of Messrs. L. E. Adams, W. E. Collinge, F. Rhodes, and B. Tomlin, which have lately appeared in the *Science Gossip* and *Naturalist*, I venture to forward some observations of my own on the above genus, which differ slightly from those of the above-named writers.

In speaking of *T. haliotidea*, Mr. Collinge* says he has found it at a depth of from four to five feet, and mentions that Mr. Quilter found *T. scutulum* at a depth of 18 inches. Dr. Jeffrey's mention of *T. maugei* not being from personal observation is open to question. Mr. Tomlin† says he has found this last-named species from six to twelve inches below the surface.

I have carefully observed these three species, but have no record of ever having found any of them below twelve inches, and in the majority of cases only five or six inches, below the surface. I have never noticed any "clean cut hole," as mentioned by Mr. Tomlin; all I have observed have generally commenced to burrow by burying

* Observations on the burrowing habits of certain land and freshwater Mollusca. *Naturalist*, March, 1891.

† Burrowing Molluscs. *Naturalist*, April, 1891.

themselves in the loose surface soil. I should like to know if they have ever been observed to use the burrows of earthworms, as, if so, they may be able to reach a great depth, but this can hardly be termed burrowing as we understand the word in regard to the mollusca. It will be as well, perhaps, to mention that my experiments were carried out on a fairly heavy soil. In future observations it would be useful to state whether the soil is clayey, sandy, compact, or loose.

CONCHOLOGICAL SOCIETIES, &c.

THE CONCHOLOGICAL SOCIETY, LEEDS.

AT the last meeting, the chair being occupied by Mr. J. W. Taylor, F.L.S., Vice-President, an interesting paper by the Rev. John M'Murtrie, D.D., M.A., of Edinburgh, was read, "On the Land and Freshwater Mollusca of the Island of Eigg," and was illustrated by a full set of the specimens collected, all of which the author most kindly presented to the Society's collection. The paper was based on these specimens and on observations made by the author during two visits to the island, in August, 1888, and July, 1890. His time was not wholly devoted to natural history, but numerous likely places were searched with some care. Eigg (pronounced "Egg") is one of the inner Hebrides, lying midway between Skye and the Point of Ardnamurchan, and is one of a group of isles from which but few records of shells have as yet been made. Politically it is in the county of Inverness, though the other islands, Muck, Rum, and Canna, which together with Eigg make up the ecclesiastical parish called Small Isles, are in another county, that of Argyll. The island is six and a-half miles long by four miles broad. Geologically it is of great interest; the prevailing rock is basalt, which is over a large part of the island disposed in columns like those of Staffa, but on a colossal scale. The "Scuir of Eigg," conspicuous to the voyager on those western seas, is of splendid columnar basalt, 1,339 feet in height. The conchologist who knows only South and East Scotland finds himself on this island in the presence of new and unfamiliar forms of molluscan life. Where the land slopes gently to the sea, *Bulimus acutus* is almost as plentiful on the grassy shores as it is on the Downs of Cornwall or the Isle of Wight; and *Helix ericetorum* is as abundant as at Dover or Folkestone, though smaller and usually with a raised spire. *Pupa ringens* keeps company with the familiar *P. umbilicata* on the under side of stones. In the few places where

damp moss and dead leaves can accumulate, *Zonites radiatulus* is evidently not scarce, and its rare variety, *viridescenti-alba*, may be found under stones. The species is probably common in North-western Scotland, as Mr. M'Murtrie has had it also from Gairloch shore, West Ross-shire. Nead-na-Feannaig (the crow's or corbie's nest) is the name of the summer home of the family of the proprietor of the island. The burn which flows beside it to the sea has been taken possession of by the white variety of *Ancylus fluviatilis*, to the exclusion of the type. A rill in the interior, on the way to the Singing Sands, contained only the var. *gibbosa* of the same species. A colony of *Helix aspersa* which here approaches its northern limit in Britain, has established itself at the foot of the minister's glebe, on the east side of Eigg, close to the sea. *Helix fusca* is also one of the species found, and numerous forms of *H. arbustorum*. The slugs include all the British species of *Arion*, as well as *Limax arborum* and *L. agrestis*. *Limnæa peregra* is the only water shell in addition to *Ancylus*. *Zonites cellarius*, *Z. alliarius*, *Z. nitidulus*, *Z. purus*, *Z. crystallinus*, and *Z. fulvus*, *Helix nemoralis*, *H. hortensis*, *H. sericea*, *H. rotundata*, *Clausilia rugosa*, and *Zua lubrica*, in addition to those specially mentioned, make up the tale of the "Eigg shells," which number 28 species, nearly all of which are fresh records. The other proceedings of the meeting included the election of seven new members, as follows:—Lady Lyons of Kilbrough, Swansea; Mr. G. E. Hadow, of South Cerney, near Cirencester; Mr. W. J. Farrer, of Virginia, U.S.A.; Mr. César Felix Ancey, administrateur-adjoint of Boghari, Algeria; Mr. J. H. A. Jenner, F.E.S., of Lewes, Sussex; the Rev. C. A. Williamson, M.A., of Longwood, near Huddersfield; and Mr. C. H. Morris, of Lewes. A candidate was also duly proposed for election at the next meeting. The donations to the library included numerous reprints, the archives of the National Museum of Rio de Janeiro, the bulletin of the Société Malacologique de France, and a copy of Montagu's most excellent work "Testocea Britannica," with the supplement, this book being given by Mr. Charles Ashford. The donations to the collection included Mr. M'Murtrie's series of shells of Eigg, and a number of interesting shells from Mr. J. C. Smith, of Penrith. These included *Clausilia laminata*, from Eden-hall, Cumberland; *Unio margaritifer*, from River Lowther, West-morland, and the Spey, at Banff; *Anodonta cygnea*, from the Spey at Banff, Great Salkeld in Cumberland, and Bisley, Surrey, and a series of shells from Aberlour, Banff, mostly new to the Society's records, including *Clausilia rugosa*, *Zua*, *Vitrina*, *Helix arbustorum*, *Zonites alliarius* and var. *viridula*, *Z. nitidulus*, *Z. purus*, *v. margaritacea*, *Z. fulvus*, *Z. crystallinus*, and *Vertigo edentula*, also examples of *Vertigo*

moulinsiana from Morden, Dorsetshire, given by Mr. C. O. Pickard-Cambridge. The donation of various sums of money towards the "cabinet fund" and of a photograph of himself from the Rev. Canon A. M. Norman, LL.D., F.R.S., an acceptable contribution to the series of portraits of conchologists which the Society is collecting, were also announced, and thanks to all the donors cordially voted. Notes on the "Viviparous nature of *Balea*" by Messrs. A. E. Craven, F.Z.S., and Edgar A. Smith, F.Z.S., and on the var. *canigonensis* or *repellini* of *Helix arbustorum*, and on the var. *subangulata* of *Helix lapicida*, both by Mr. J. W. Taylor, F.L.S., were read, and in the case of the latter gentleman's notes, duly illustrated by the actual examples referred to. Among the exhibits were a fine living example of *Arion ater* var. *alba* from the North Esk at Morphic, N.B., sent by Mr. W. Duncan, and identified by Mr. W. Denison Roebuck, F.L.S.; also shells of *Geomalacus maculosus* from Lough Caragh, Kerry, *Limnæa truncatula* from Winster, its var. *picta* from Pont Fadoc, Wales, *Physa hypnorum* var. *rubra* from Carberry Lake, Manitoba, *Succinea stagnalis* from the Canal at Bath, *S. virescens* from Guernsey, and *Spherium ovale* from Blue Bridge, York, all shown by Mr. Taylor.—*Yorkshire Post Supplement.*

MANCHESTER CONCHOLOGICAL SOCIETY.

The monthly meeting of this Society was held on Thursday evening, May 14th, at 26, George Street, Mr. Thomas Rogers in the chair. Mr. John Radcliffe exhibited some very beautiful forms of *Helix Pisana* from Turkey. Mr. R. Cairns showed *Anodonta cygnea*, from Lochend, near Edinburgh, and a number of *Helix aspersa*, from Geelong, Australia, amongst which he had found a sinistral, or reversed specimen. *H. aspersa* has been introduced into the Antipodes in many places, and seems to have readily acclimatised itself, but the shells are considerably less in size than the ordinary European specimens.

On Whit Monday the Society had an excursion to Marple. A goodly number of species of both land and freshwater molluscs were found, including several of considerable interest from their rarity or local occurrence. A careful search amongst the long dead grass on the canal bank was productive of a very local species, *Zonites nitidus*, in company with *Zua lubrica*, and others. Amongst a patch of nettles were found many fine specimens of *Helix concinna*, together with *Helix hispida*, *Clausilia rugosa*, *Zonites fulvus*, *Z. Nitidulus*, and a few *Helix nemoralis*, *H. hortensis*, and *H. arbustorum*, three of our larger Helices which

appear to be slowly but surely disappearing from a considerable area around Manchester, probably from the poisoning of the herbage by smoky rain, and the attacks of the thrushes and blackbirds, which have certainly increased in numbers of late years, and are ever on the look-out for such dainty morsels as these shells afford. On the way to the Aqueduct portions of the canal were dredged, and many of the usual freshwater species obtained, the chief takes being *Paludina contecta*, *Pisidium amnicum*, and fine *Physa fontinalis*. At the top of the railway embankment *Zonites excavatus* was taken in some quantity, by carefully searching under stones, and amongst the long dead matted grass. It is rather curious that all the shells of this species found here are the pretty greenish variety *vitrina*, the brown typical shell being absent. Both the type and variety of the species are very local, and the variety is rare. Some fine specimens of *Zonites glaber* and a quantity of the pretty little *Carychium minimum* were found under stones along the bank of the river.

A pleasant stroll along the river bank brought the party to a pretty wood, and in this most part of the afternoon was spent, for it proved to be a locality much favoured by some of the rarer and much coveted species of shells. Here, under dead sticks and leaves, were found *Vertigo edentula*, *Helix aculeata* of large size, *Zonites fulvus*, *Z. purus* and *Carychium* in abundance, along with *Clausilia laminata*, and many other species; and the sharp eyes of the conchologists were used to good purpose, as the comparative notes exchanged when the collecting bottles were produced around the table after tea at Marple Bridge showed.

Altogether thirty-six species were taken, exclusive of the slugs, of which many specimens were observed, some of them showing great variety in colouring, examples of which were collected by the "slug-man" of the party for leisurely determination at home, and included seven species.—*Manchester City News.*

ZOOLOGICAL SOCIETY OF LONDON.

April 7th.—F. Du Cane Goodman, F.R.S., Vice-President, in the chair. Among the papers read was one by Mr. T. D. A. Cockerell, on "The Geographical Distribution of Slugs." The author divided the known slugs into six families:—*Succineidæ*, *Vaginulidæ*, *Arionidæ*, *Limacidæ*, *Testacellidæ*, and *Selenitidæ*, under which he grouped fifteen sub-families. The *Janellidæ* were reduced to a sub-family of *Succineidæ*, and the generic nomenclature of the whole group was revised, two new genera and one sub-genus being named. The *Philomycidæ* were made a sub-family of the *Arionidæ*. The distribution of each

sub-family, and of all the recognisable genera, was discussed in some detail. Under the *Veronicellinæ* a new sub-genus, *Imerinia*, from Madagascar, was indicated.

May 5th.—Some notes on Slugs of the Ethiopian Region, based on specimens in the British Museum, were read by Mr. T. D. A. Cockerell; and Col. Beddome read descriptions of some new land shells from the Indian region.

BIBLIOGRAPHY.

Annals and Magazine of Natural History.

APRIL.

Notes on Slugs, chiefly in the Collection at the British Museum.—T. D. A. Cockerell.

On the Necessity for the Abandonment of the Generic name *Cyclostoma*.—R. Bullen Newton, F.G.S.

Additional Notes on the Mollusk *Lepton*, as a Commensal.—Rev. Canon Norman, M.A., D.C.L., F.R.S., &c.

MAY.

The Genera *Cyclostoma* and *Pomatias*, and on a misapplied rule of Zoological Nomenclature.—Rev. Canon Norman, M.A., D.C.L., F.R.S., &c.

Description of three New Species of *Helix*, from New Guinea.—Edgar A. Smith, F.Z.S.

On the Heart of *Dentalium*.—Dr. L. Plate.

JUNE.

Reply to Canon Norman's views respecting the proposed rejection of *Cyclostoma*.—R. Bullen Newton, F.G.S.

Mr. Cockerell's paper on the Slugs in the British Museum deals with the *Pirainea* section of *Amalia*, which, unlike the *Tandonia* section, are widely distributed in temperate regions. The various forms of *A. gagates* are described, and descriptions given of a number of new forms. This paper forms the fourth of the series, which constitute a most valuable addition to our knowledge of this class of the Mollusca.

Mr. R. B. Newton proposes that the term *Cyclostoma* should be abandoned, and that of *Pomatias* used instead. The term *Cyclostoma* was first used by Lamarck (1779) for a group of shells that we now term *Scalaria*. It was next used by Lamarck (1801) for what he subsequently termed *Delphinula* (1803). For the genus *Scalaria*, Mr. Newton proposes to drop the term *Cyclostoma*, and write *Delphinula*. The *Cyclostoma* of modern authors was originally termed *Pomatias* by Studer (1789), of which our *C. elegans* was the type. Mr. Newton therefore proposes that *Pomatias* be adopted instead of *Cyclostoma*. The *Pomatias* of Hartmann is then said to be without a name, so is termed *Hartmannia*, Newton.

Canon Norman thinks Mr. Newton has misapprehended the facts of the case. Lamarck, says Canon Norman, did not form three genera named *Cyclostoma*, but one, but applied the name with different applications—viz., it included all the genera named in Mr. Newton's article. The argument is specially based upon Rule 10 of the British Association Rules of Zoological Nomenclature, "A name

should be changed, which has before been proposed for some other genus in Zoology or Botany, or for some other species in the same genus, when still retained for such genus or species."

Mr. Newton's reply materially strengthens his position. He claims priority for Studer, which cannot be overlooked on the ground of the British Association's rule, which, in Mr. Newton's opinion, requires revision.

Mr. Cockerell (Brit. Nat. Mag.) points out that *Cardiotoma* of Sandberger ought to be used for the *Pomatias*, Auctt., instead of *Hartmannia*, this latter term having already been twice used as a generic title in Botany.

Mr. Newton gives the corrected synonymy, as follows :—

Genus POMATIAS, B. Studer, 1789.
Type = *Nerita elegans*, Müller,
(Non. Hartmann, 1821 = *Hartmannia*).
= *Cyclostomus*, Montfort, 1810.
= *Cyclostoma*, B. Studer, 1820.

Genus DELPHINULA, Lamarck, 1803.
Type = *Turbo delphinus*, Linnæus.
= *Cyclostoma*, Lamarck, 1801.
(*Non.* Lamarck, 1799).

Genus HARTMANNIA, R. B. Newton, *nom. mut.*
Type = *Cyclostoma patulum*, Draparnaud.
= *Pomatias*, Hartmann, 1821.
(Non. B. Studer, 1789).

Genus SCALA (Klein, 1753), G. Humphrey, 1797.
Type = *Turbo scalaris*, Linnæus.
= *Cyclostoma*, Lamarck, 1799.
= *Scalaria*, Lamarck, 1801.

A most interesting abstract of Dr. Plate's paper, from the "*Zool. Anz.*," February, 1891, is given, in which he describes a rudimentary heart of a very simple structure.

British Naturalist.

APRIL.

Mollusca-Bibliog.—T. D. A. Cockerell.
Notes and Queries, &c.
Note on *Helix dentoni*.—C. F. Ancey.
Description of a new species of *Helicidæ*.—C. F. Ancey.

MAY.

Mollusca-Bibliog.—T. D. A. Cockerell.
Notes.

JUNE.

Mollusca-Notes.—T. D. A. Cockerell.

Mr. Cockerell (Bibliography, April), concludes his useful review of Westerlund's work. Under the heading "Notes, &c.," will be found a number of matters of interest to Conchologists.

Mr. C. F. Ancey is of opinion that *H. dentoni* Ford, is synonymous with *H. cyclostomata* Leguillon, he also points out that *Auctus Pilsbryi*, Ford, is synonymous with *B. capueira*, Spix., var. *laminifera* Ancey, and that Pilsbry's sub-genus *Gonostomopsis* (for *Helix auridens*, Rang.), is what he (Mr. Ancey) grouped under the name of *Chrysodon*. It is a great pity authors do not exercise more care in these matters, before creating a lot of useless synonyms.

In his May notes, Mr. Cockerell points out the change (mentioned elsewhere in this number) re *Limnæa palustris* var. *nana*, Ckll., and also gives a description of *Pupa coloradensis* Ckll., and *P. ingersolli* Ancey, both mentioned in his "Preliminary Remarks on the Molluscan Fauna of Colorado," *Journ. of Conch.*, p. 60, vol. vi., 1889. The record of a new species of Arion, found by Mr. Cockerell, is extremely interesting. The description is as follows:—"*A. ambiguus* is perhaps only a variety or sub-species of *A. bourguignati*, from which it differs in its lack of keel or pale dorsal line, and in the slightly yellowish tint of the sole, especially at the sides. It is perhaps not unlikely that *A. circumscriptus* was founded on *A. ambiguus*, rather than *bourguignati* proper." The specimens belong to the var. *armoricana* Poll., and a new var. is described under the term *sub-albida* Ckll.

Journal of Conchology.

APRIL.

On the Nomenclature of Certain Genera of British Land and Freshwater Shells. Edgar A. Smith, F.Z.S.

Helix hortensis m. *sinistrorum* and m. *scalariforme* in S. Devon.—E. Collier.

Helix hortensis v. *lutea* 12045 at Dovedale.—Rev. H. Milnes.

The Marine Shells of Scilly.—Clifford Burkill and J. T. Marshall.

Vertigo Moulinsiana, Dupey in Dorsetshire.—Robert Standen.

Notes on the Food of some of the British Mollusks.—W. A. Gain.

Proceedings of the Conchological Society.

The most important contribution to this number is Mr. Edgar A. Smith's Presidential address before the Conchological Society, dealing with the nomenclature of various genera. On the ground of priority Mr. Smith contends that we should use the term *Viviparous* instead of *Paludina*, *Vitrea* instead of *Zonites*, and *Acicula* for *Acme*. An interesting article is contributed by Mr. W. A. Gain, on the food of certain molluscs, the details of which seem to have been carefully worked out. The Catalogue of the Library of the Conchological Society is also contained in this number.

Naturalist.

APRIL.

Burrowing Molluscs.—B. Tomlin, B.A.

Mr. Tomlin contributes an interesting note on the burrowing habits of *Testacella maugei*, *Hyalina nitidula*, and *Helix pomatia*.

Science Gossip.

APRIL.

The Colour and Banding in Land and Freshwater Shells: A Reply to Mr. Fryer.—J. W. Williams.

Physa acuta in Scotland.—W. D. Rae.

Dwarf var. of *Helix Sylvatica*.—C. P. Gloyne.

Local Conchological Society.

Classificatory Position of the Mollusca.—P.Q.K.

MAY.

Mounting Shells.—S. Pace.

A New Variety of *Helix cantiana*.—J. W. Williams.

Power of *Limnæidæ* to resist cold.—W. A. Gain.

JUNE.

The Shell Colouring of Non-Marine Mollusca.—W. M. Webb, F.L.S.
A partly scalarid specimen of *H. aspersa*, from West Kent.—J. W. Williams.
Classificatory Position of the Mollusca.—J. W. Williams.
Mounting Shells.—G. T. Staveley.
Local Conchological Societies.—G. T. Staveley.

An interesting discussion is to be found in the May and June numbers on the Colouring of Land and Freshwater Shells, which seems to be receiving some little attention at present.

OBITUARY.

PROF. JOSEPH LEIDY, M.D., LL.D.

WE regret to have to announce the death of Professor Joseph Leidy, M.D., LL.D., one of America's most eminent zoologists, who died at his residence in Philadelphia, on April 30th, 1891, at the ripe age of 67. Although there is hardly any branch of zoological literature to which Dr. Leidy has not made most valuable additions, he is perhaps better known in this country by his careful and extensive memoirs on vertebrate palæontology and, more especially to conchologists, as the author of the chapter on the anatomy of the mollusca in Binney's "*Terrestrial Mullusks*" illustrated by his fine series of anatomical drawings. In 1880 Dr. Leidy was elected President of the Academy of Natural Sciences of Philadelphia, which position he continued to hold until his death. He was one of the Lyell Medallists of the Geological Society, and an honorary member of numerous learned societies throughout the world.

NOTES AND QUERIES.

Literature on the Genus Vitrina.—Mr. Neal will find references to the habits, &c., of this genus in the following articles:—

Dr. Simroth "Beitrage zur Kenntniss der Nacktschnecken," chap. 1, p. 5. *Nova Acta Ac. Cæs. Leop-Car. Germ. Nat. Cur.*, 1890.
Melville and Ponsonby *Ann. and Mag. of Nat. Hist.*, Dec., 1890.
Tryon's Manual of Conchology, Vol. 1, 2nd series.
H. Perkins and others, *Science Gossip*, Vol. 8, 1872.
W. E. Collinge "Observations on *V. pellucida*." *Zoologist*, p. 467, 1890.

Helix aculeata, Müll., in West Kent.—On May 26th, I picked up three specimens of *H. aculeata*, clinging to a half rotten piece of wood, in a damp situation; at Wychling, near Sittingbourne, Kent. As I find it is not recorded in the Conchological Census for West Kent, am I right in concluding this is its first record for that county?—E. W. SWANTON, Doddington, Sittingbourne.

List of Shells found on Chanctonbury Ring, Sussex.—On April 28th, 1891, whilst staying near Worthing, I walked to Chanctonbury Ring—which is, I believe, the highest point in Sussex—and obtained the following species:—*H. aspersa, H. nemoralis, H. cantiana, H. caperata, H. rufescens*, with var. *alba; H. rotundata, H. pulchella*, with var. *costata, H. hispida, H. aculeata* (not mentioned in the Conchological Census for West Sussex); *Vitrina pellucida, Carychium minimum, Hyalina fulva, Hyalina nitidula, Balea perversa, Clausilia rugosa, Clausilia laminata*, and *Cochlicopa lubrica. Limnæa peregra* were in abundance in a small pool there.—E. W. SWANTON, Doddington, Sittingbourne.

New Shells from Southport.—Mr. J. W. Williams is far wide of the mark in describing the species in his list as new records for South Lancashire, all but two species (*Amalia marginata* and *Zonites excavatus*) having been recorded by Mr. Standen and myself from the undermentioned localities in South Lancashire.

Zonites alliarius. Common along the Ribble valley. Manchester, &c. (Standen, Lanc. L. and F. Moll.).

H. aspersa. Walton-le-dale. Gardens at Preston. Whalley. (Ibid.)

H. virgata. Southport. (Ibid.)

H. pygmæa. Taken in Barlow Woods. (Ibid.) I also recorded this species at Leeds two years ago as "common at Farington."

V. pygmæa. Farington. These I sent to Leeds for record in 1889-90.

P. marginata. Common on the Sandhills, Southport. (Standen, Lanc. L. and F. Moll.)

I took *A. marginata* at Hesketh Park, Southport, in 1889, but did not record it, and since Mr. Standen's list appeared in 1887 I have recorded many of the above species from numerous South Lancashire localities.—W. Hy. Heathcote, Preston.

[*Hyalina nitidula* was recorded from South Lancashire by Mr. T. D. A. Cockerell, in the *Naturalist*, Feb. 1886, p. 55. *Helix aspersa* and *Pupa* (*muscorum*=) *marginata* are included in a list of the shells of Southport, Mr. J. Darker Butterell informs me, published in 1859, in a work entitled "A Handbook for Southport, Medical and General, with copious notices of the natural history of the district," by H. McNicoll, M.D., &c.—Editor.]

ANSWERS TO CORRESPONDENTS.

All communications intended for publication must be authenticated with name and address of sender.

T. S.—Mr. Cunningham's Paper on "The Renal Organ of Patella" was published in the Quar. Journ. Micro. Sci. for 1883. There is a paper by Mr. Charles Ashford, entitled "On the Action of the Heart in the Helicidæ during Hibernation" in the Journal of Conchology, vol. 3, p. 321, 1882 (No. 11, July).

T. D. B.—We thank you for your letter. Very few, if any, we find, are new to the district.

F. L. S.—We shall be very pleased to receive your observations on the subjects named, especially those dealing with the anatomy.

A. M. N.—We thank you for acknowledgment.

W. G. B.—We thank you for your letter and good wishes, and shall be very pleased to receive your contributions.

Dundee.—You should have no difficulty whatever in obtaining them. Any of the dealers who advertise on our covers would get you them. Foreign dealers will charge you much more.

C. H.—R. Friedlænder & Sohn, Carlstrasse 11, Berlin. While agreeing with your arguments in favour of such a Society, which is no doubt much needed, we could not take the initiative in such a matter.

THE CONCHOLOGIST:

A Quarterly Magazine for Conchologists.

Vol. I. SEPTEMBER 29th, 1891. No. 3.

NOTES ON ARION HORTENSIS, A. CIRCUMSCRIPTUS, AND THEIR ALLIES.

BY T. D. A. COCKERELL.

ALTHOUGH all the slugs considered in the present paper were formerly referred by British authors to *Arion hortensis*, there are at least two very distinct species, and possibly three or more. *Arion hortensis* and *A. circumscriptus* (or *bourguignati*) differ in so many characters, both external and anatomical, that once known, they need never be confounded. *A. ambiguus*, which recently turned up in Dorsetshire, is so extremely near to *bourguignati* that its validity as a species must for the present be considered doubtful. Lastly *A. celticus*, which occurs at Brest, in France, may be expected in S.W. England or S. Ireland—or at least may be looked for, since it so resembles *hortensis* that if it were common there it would not be recognised as distinct without an examination of the anatomy. Whether, indeed, *A. celticus* is a distinct species seems quite as doubtful as in the case of *A. ambiguus*, but Pollonera has found anatomical characters to separate it.

I will proceed to give descriptive notes, and a provisional classification of the forms; at the same time expressing the hope that some of your readers will make further research, so as to decide more clearly the points at issue.

1.—Arion hortensis, Fér.

(1*a*) Subsp. *hortensis*, s. strict. 25 millim. long; sole, pale orange; back strongly rugose, with elongate rugæ, the sulci between

them dark; back and mantle dark, minutely speckled with pale yellow; sides with dark bands; foot-fringe without lineoles; head and tentacles dark plumbeous; mucus-pore distinct, mucus yellow; lateral bands of mantle fairly straight, enclosing respiratory orifice.

Described from three living specimens, found by D. B. Cockerell at Acton, Middlesex, February 11th, 1891.

Form. **fallax**, Ckll., "Garner," 1886, p. 139. I found this variety again last year at Headley Lane, Surrey, quite common upon the beech trees. I have placed specimens in the British Museum. It is doubtful whether *fallax* can be separated from var. *subfusca*, C. Pfr.

Form. nov. **albipes.** A single immature specimen was found with the type at Acton, Middlesex, February 11th, 1891, by D. B. Cockerell. Length about 13 mill.; like *hortensis*, but greyer, not so rugose; *sole white;* no keel; mucus-pore well developed; lateral bands of mantle enclosing respiratory orifice; foot-fringe without lineoles; body and mantle minutely speckled with pale yellow; tentacles, blue grey.

This is simply a variety of *hortensis*, with colourless slime. The yellow sole has been thought one of the most invariable specific characters of *A. hortensis*, but in this slug it is lost, and yet the affinities of the animal are so obvious that it would be absurd to make a new species of it.

Other forms of *A. hortensis* which deserve further enquiry are recorded in the following places:—(1) "Science Gossip," 1884, p. 236. (2) "Nat. World," 1885, p. 222. (3) "Journ. of Conch.," 1887, p. 181. (4) "Journ. of Conch.," 1891, pp. 349-352. (5) "Journ. of Conch.," 1883, p. 40, &c.

I have not dissected many specimens, and have little to say about the anatomy from personal observation. There seems to be a considerable variability in the form of the penis-sac. The Acton *A. hortensis* has that organ straight, or but little curved; while in an example found at Chislehurst, Kent, in July, 1885, it was sharply bent back upon itself at the end, it and the commencement of the vas deferens forming roughly a sort of compressed S. Unless (as is surely not probable) we have here two species confounded together, the value of these characters for separating species is evidently not so great as has been supposed. It will only be by the dissection of many specimens that the constancy, or otherwise, of these anatomical characters can be ascertained.

(1*b*) Subsp. **celticus**, Pollonera. Length (in alcohol) 14 mill.; mantle, 5 mill. long; respiratory orifice, well anterior. Sole yellowish, unicolorous, finely obliquely striate, not differentiated into parts. Mantle oval, the broad end posterior, dark grey, with blackish lateral bands, rather going over than surrounding the respiratory orifice. Body grey, the sides paler but dark reticulate; blackish lateral bands, bordered above by a palish band. Rugæ flattened. The lineoles on foot-margin not much darker than the margin itself.

Described from three alcoholic specimens kindly sent to me by Mr. Pollonera, collected at Brest, France. So far as external characters go, I see no specific difference from *hortensis*. For the anatomy, see "Pollonera Atti. Acc. Sc. Torino," 1887, p. 19, and figs.

2.—Arion circumscriptus, Johnst.

= *fasciatus (pars)*, Nilss.

(2*a*) Subsp. **bourguignati**, Mab. Usually distinguished at once from *A. hortensis* by its white sole. A specimen of *bourguignati*, compared with the white-soled variety of *hortensis*, was still easily distinguished by its grey back mottled with blackish, and the absence of the pale yellow minute specks of *hortensis*. The keel, also, is pale, and the edge of the foot sublineolate. This species is common in most parts of the British Isles. Mr. Pollonera sent me three specimens from Ceresole Reale, Piemont.

Form. nov. **atripunctatus**, with numerous black points on the mantle. Found by Mr. G. Roberts at Lofthouse, Yorkshire, May, 1887.

(2*b*) Subsp. **ambiguus**, Pollonera. See "Pollonera Atti. Acc. Sc. Torino," 1889, p. 15, and figs.

Var. **armoricana**, Pollonera. Specimens found at Sturminster Marshall, Dorset, resemble the var. *subalbida*, but are smaller; *slightly* keeled; sides, bluish grey, instead of white; margin, not lineolate; slime, not coloured. In alcohol the sole, which was bluish or greyish-white, became decidedly yellowish, but it may have been stained by the slime of an *A. hortensis* in the same bottle, which had turned the alcohol yellow.

Form. **subalbida**, Ckll., Brit. Nat., 1891, p. 101. Size and shape of *bourguignati*, but no keel; head and tentacles grey; sides below bands, opaque white; bands as in *bourguignati*; area between bands, dark grey on back, pale grey on mantle

darkest in median line—*i.e.*, with a dark broad dorsal band, then a paler grey sub-dorsal area, and then the dark lateral bands; neck, grey above; respiratory orifice white margined; sole, white; the white of the sole and sides is really a creamy-white—*i.e.*, with a yellowish tint, especially sides of sole. The general colouring is like *A. ater* (*empiricorum*) var. *albolateralis*, but the margin is not orange; margin with slight grey marks at intervals, but no lineoles; mucus-pore equilaterally triangular, well-formed; slime not coloured. One specimen at Bailey Gate, Dorset.

The above description was made from the living slug; after it was in alcohol I made the following notes :—

Length (in alcohol) 13, lat. $3\frac{1}{2}$; mantle long, 5 mill.; respiratory orifice, 2 mill. from anterior border of mantle; sole, lat. $3\frac{1}{3}$ mill.; sole, slightly transversely grooved laterally, no distinct areas; sole-edge not dark lineolate, but sides of body with a line parallel to sole, where the sulci bend downwards, simulating a lineolate sole-edge; mantle truncate anteriorly, rounded behind; no keel on body; reticulations elongate; tail bluntly rounded. In spirit, under the same conditions as the var. *armoricana* recorded above, the sole and sides turned pale primrose yellow.

It is difficult to find good characters to separate these slugs grouped under *circumscriptus*. In the forms referred to *ambiguus* the keel is practically obsolete, and what is more important, there is no sort of pale dorsal line. The sole, also, in the living slug is not of the same dead-white colour as in *bourguignati*, but is more inclined to creamy or greyish. In all these respects the characters of *A. hortensis* are approached, and yet the whole build or "facies" of the slug is so essentially that of *circumscriptus* that it need not be confounded with *hortensis*, even on the most superficial examination. It seems especially important that living slugs in this group should be studied, as the keel and sole characters are deceptive at times in alcohol. For separating *bourguignati* from *ambiguus*, it is also desirable to have some young examples, as old specimens of true *bourguignati*, especially when in alcohol, do not show any keel. I think the young of true *bourguignati* has *always* at least some trace of the pale dorsal line, even in alcohol.

INSTITUTE OF JAMAICA: KINGSTON, JAMAICA.
August 12th, 1891.

A VISIT TO COOPER'S HILL, GLOUCESTERSHIRE.

By WILLIAM NELSON,

Hon. Curator to the Conchological Society of Great Britain and Ireland.

At an early hour on the morning of April 19th, 1867, Mr. J. W. Taylor and myself started from Camp Hill Station, Birmingham, for Cheltenham. On the journey we noticed some fields near King's Norton almost yellow with the splendid flowers of the daffodil, and in some places the banks of the railway cuttings were liberally besprinkled with the flowers of the cowslip. On arriving at Cheltenham, at about 8 A.M., we at once made our way to the Painswick Road, and, on arriving here, we commenced our search for shells. In a small damp ditch we found examples of *Limnæa truncatula;* a little further on the road we obtained specimens of *Helix rufescens* and some nice varieties of *Helix nemoralis* and *H. hortensis* (alas! those good old days when the conchologist had not to give a varietal name to nearly every individual specimen he collected, but was content to swear by Jeffreys). The two latter species were at about a foot from the ground in the hedgerows, generally a sure sign of a wet day. Amongst the *H. nemoralis* was one of abnormal form. It had the normal reflected lip of all adult shells of this species, but after completion it had begun to enlarge its shell, and had made the growth in a very rough and unfinished manner, which it had continued for about half a whorl. We made a halt by the side of a rippling brook a little past Shurdington, where an unsuccessful search was made for water shells, and turned our attention to the land species. At the base of some willows we obtained examples of *Helix pulchella*, *H. rotundata*, and *Pupa umbilicata.* Crossing a field, we now took to a footpath which leads direct to the hill. Beside a garden bank we stayed and searched, and obtained a few specimens of *Cyclostonia elegans*, and one or two specimens of *Clausilia rolphii;* and, whilst turning over some dead leaves, I disturbed a slow-worm, which quickly glided away. Entering the wood at the side of the hill, we examined a dry but moss-covered wall, where we found *Helix rupestris* to be very common. Going further into the wood, we came to a large damp hollow, near to the remains of the Roman villa; here we stayed and made a prolonged search amongst the dead leaves of the beech, which lay nearly a foot deep in this part of the wood. By careful searching we secured about twenty examples of *Clausilia rolphii.* A heavy downpour of rain necessitated our leaving our position, which had been one of lying at full length, face downwards,

examining the dead leaves, which serve to hide the *Clausilia*, which so very closely resemble their surroundings in colour. The *Cyclostoma elegans* obtained here were much larger in size, and paler in colour, than those obtained on the garden bank, where they are exposed to the influence of the sun. During our search here we secured examples of *Vitrina pellucida*, the large flattened form *depressiuscula*, Jeffreys, *Zonites cellarius*, *Z. nitidulus*, *Z. crystallinus*, *Z. fulvus*, *Helix rufescens* and its variety *albeda*, *H. hispida*, *H. rotundata*, *H. lapicida*, *Bulimus obscurus* and its variety *alba*, *Carychium minimum*, *Vertigo edentula*, and *Cochliocopa lubrica*. Climbing to the top of the hill we found *Helix virgata*, but of only small size (one of the specimens had two distinct bands above the periphery, and was afterwards identified by Dr. Jeffreys as the variety *subglobosa*); *Helix ericetorum* (a specimen of which was white with translucent bands). *Helix caperata*, and *Pupa secale* were moderately common on the small loose stones. Descending the hill again, we found the trunks of the beech trees were studded with *Clausilia laminata*, many of which were the greenish-white variety *albida*. We also found here *Bulimus montanus*, amongst which were two or three albino specimens, which were afterwards named *pallescens* by Dr. Jeffreys. Proceeding along the footpath towards Birdlip, we turned and went direct up the hill towards Cranham Wood; searching a wall there we found *Balia perversa*, but only sparingly. Returning to the footpath near the cottage (I may mention that it was here that Mr. Blatch took the variety *albina*, Menke, of *Helix lapicida*—the specimen is now, I believe, in the rich collection of Dr. Philip B. Mason, of Burton-on-Trent), we retraced our steps through the wood, where we secured *Helix pomatia*, *H. aspersa*, and the variety *exalbida*, Menke. Just as we left the wood Mr. Taylor found a beautiful example of *Helix nemoralis* with translucent bands. On leaving the hill we took the wrong road, and soon found ourselves in a boggy field. After some little difficulty we got upon the solid turnpike, and arrived at Cheltenham Station too late for the Birmingham train. We had to retrace our steps into the town and search for lodgings, which were not secured without some little difficulty, as the hour was late.

Next morning I awoke about 5 A.M., and as I lay the rain could be heard pitilessly falling. At 6 A.M. it still rained. I woke Mr. Taylor and we proceeded to get ready for off. At 8 A.M. we turned out in the heavily-falling rain, and as we glanced upwards we received no comfort from the uniform leaden-coloured sky. Once out of doors we had to decide what we should do; after changing our minds several times, we turned along the Painswick Road to pay one more visit to Cooper's Hill. As we journeyed along we

gathered specimens of *Helix nemoralis*, the rain still continuing to pour down. Arriving at the hill we at once went into the wood. The rain, which had up to now been falling heavy, and with a dogged perseverance, now literally fell in torrents, so that we were quickly wet through. Down the trunks of the beech trees the water ran in little streams. The compensation for all these discomforts was such an abundance of molluscan life—both slugs and snails—as I have never seen before or since. *Bulimus montanus*, *Clausilia laminata* and the variety *albida*, *Helix lapicida*, and *Limax marginatus*, Müll. = (*L. arborum*, B.-Ch.), were simply in profusion. We also found *Amalia sowerbyi*, Fér. = (*L. marginatus*, Auctt. Britt.) About noon the rain ceased, the sun began to shine, and we were further enlivened by hearing the cuckoo for the first time that year. During the afternoon we continued collecting an occasional *Zonites purus* var. *margaritacea* and *Z. alliarius*. Amongst others I found a specimen of *Clausilia rugosa* with the mouth evidently finished, and then, as in the case of *Helix nemoralis*, some additional growth of the shell, made in a rough manner; in this case not following the axis of growth, but prolonged into a tube, after the manner of some of the *Cylindrella*. Proceeding through the wood we arrived at Birdlip, where, on the tops of the loose stone walls, we found *Helix rupestris* in myriads. Coming towards Leckhampton, and searching the hedge-bottoms, we obtained *H. arbustorum*, and on the slopes of the Cotteswolds near to Leckhampton we found *Helix ericetorum* and *H. caperata*. Arriving at Cheltenham we proceeded by train to Worcester, where we stayed for the night, and started next morning to walk to Birmingham.

Between Worcester and Droitwich we collected an occasional specimen of *Helix nemoralis*, *H. hispida*, and *Zonites cellarius*, on the roadside. We passed on through Browsgrove and Northfield, and arrived at Birmingham well tired, but with such a collection of shells as we shall probably never see again.

CROSSGATES, NEAR LEEDS.

NOTES ON LIMNÆA TRUNCATULA, MÜLLER.

BY THOS. R. WALKER.

FOR some years I have kept a number of these interesting molluscs in my aquarium, upon whose habits, &c., I have from time to time made a many notes, some of which may possibly be of interest to

your readers. *L. truncatula* may well be termed an amphibious mollusc, for it is as often found out of the water as in it. Unlike many of the *Limnæidæ* this species is seldom found on the bottom of the aquarium (mine is about 16 in. deep), but generally crawls close to the surface or out of the water altogether. Specimens which had been attached to the sides of the glass above the water for nearly five weeks, quickly revived on being placed in the water. Mr. A. P. Thomas* (whose observations on this species are exceedingly interesting), says: "To test their power of resisting drought, I collected specimens and placed them in an open vessel on a shelf in a dry laboratory, in a position where the sunshine fell on them for an hour or so daily. I found that rather more than 50 per cent. withstood twenty-six days of this treatment, and some few revived after more than six weeks. That the snails can live on moist ground quite away from any quantity of water for considerable periods, is sufficiently proved by the fact that I have kept them alive for eleven weeks on moist grass and moss, even when infested with *Fasciola hepatica*."

In my aquarium the egg-capsules have always been deposited on the stems of plants, and contain from twenty to twenty-five eggs. It is an exceedingly prolific species.

Specimens fed largely upon lettuce leaves developed very fragile shells. Generally speaking, they will eat any vegetable matter, but show a preference for that floating on the surface. A number I kept in a separate aquarium, and fed on lettuce and cabbage leaves, attained quite a large size, but on being replaced in the larger aquarium their shells quickly became eroded, and they all died, really for want of a shell. It is a very variable species. Like other members of the genus, those living in large ponds or lakes attain a much larger size than those living in ditches and shallow water.

ON THE BURROWING HABITS OF THE GENUS TESTACELLA, CUVIER.

By W. E. COLLINGE.

Respecting Mr. Horsman's remarks on my paper, published last March in "The Naturalist," "On the Burrowing Habits of Certain Land and Freshwater Mollusca," it appears very evident to me that his conclusions were drawn from insufficient observations. Mr.

* A. P. Thomas, M.A., F.L.S., Quar. Journ. Micro. Sci., Vol. xxiii., p. 99, 1883.

Horsman informs me that his observations extended over a period of five or six months, and were carried out under artificial conditions. Under these circumstances it is hardly fair, I think, to criticise observations made from nature. "A fairly heavy soil," kept in a "large old tank in an outhouse," would soon become caked and very firm, and consequently, it would be almost impossible for a mollusc to get below twelve inches; in fact, I do not contend that in heavy soils molluscs do burrow to great depths. Where I saw *T. haliotidea* it was in a light loamy soil. Mr. Horsman speaks of the average depth as five or six inches; now had he paid the slightest attention to the habits of our British slugs in their *natural conditions*, he would know that most of them burrow to that depth when depositing their eggs, as has been described by Moquin-Tandon and other writers. I have not had the opportunity of studying *T. scutulum*, but from what I know of the habits of *T. haliotidea* I cannot see any valid reason to doubt the accuracy of Mr. Quilter's observations, nor do I agree that Dr. Jeffrey's statement is open to question. The other records mentioned in my paper are all from well-known conchologists and careful observers, and I fail to see any cause for doubting them.

THE CONCHOLOGIST:

A QUARTERLY MAGAZINE FOR CONCHOLOGISTS.

"The Conchologist" is published on each quarter-day. Annual Subscription, 3s. 6d., post free. Single Copies, 10d. each.

All communications intended for publication, advertisements, and books, &c., intended for review, should be forwarded on or before the 1st of the month preceding publication, and addressed to

W. E. COLLINGE, *108, Woodsley Road, Leeds.*

SEPTEMBER 29th, 1891.

Editor's Notes.

IN "Answers to Correspondents," in No. 1, we stated that we could not undertake to name collections of shells. A correspondent, however, suggests that we should publish the names of a few conchologists who are willing to name or verify specimens, which we shall be pleased to do on receipt of the names of any who are willing to render this assistance.

WE are pleased to note that Mr. William Nelson, of Leeds, has lately been appointed one of the Honorary Secretaries for the Conchological Section of the Yorkshire Naturalists' Union, in place of Mr. John Emmet, F.L.S., resigned.

IT is very satisfactory to hear of the success that has attended the organising of an American Association of Conchologists, which has now been in existence for some twelve months. It has already enrolled nearly 200 members, who have contributed 573 species of molluscs to the United States collection. We wish it a prosperous and useful career.

THE collection of shells of the late Sir David Barclay, Bart., was offered for sale by Messrs. Stevens, London, on July 6th, and three

following days. Some 1,200 lots were catalogued, amongst which were a number of very rare species and type specimens. A single specimen of *Voluta aulica* realised £10; of *Murex barclayi*, £9, 10s.; and one of *Marginella mirabilis*, £6, 10s.

A number of communications unavoidably stand over for want of space.

THE LAND AND FRESHWATER MOLLUSCA OF OXFORDSHIRE.

By W. E. COLLINGE.

(*Continued from page* 35.)

BULIMUS, Scopoli.

Bulimus montanus, Drap.

I have been unable to meet with this species which is recorded by Whiteaves as under.

6. Oxford. — Found abundantly at Sherborne Wood near Watlington (Whiteaves, 1857).

Bulimus obscurus, Müll.

A fairly common species occurring in greater abundance in the more southern parts of the county.

PUPA, Drap.

Pupa secale, Drap.

Though by no means rare, is confined to the calcareous districts where it occurs plentifully.

Pupa umbilicata, Drap.

A very common form and well distributed.

Var. edentula, Moq.

6. Oxford.—(Whiteaves, 1857). (S. Spencer Pearce, 1883).

Var. **albina**, Moq.

6. Oxford.—With type (Whiteaves, 1857).

Var. **edentula**, Moq.

6. Oxford.—"Two specimens from an old pollard-willow, near South Hincksey" (S. Spencer Pearce, 1883).

Pupa marginata, Drap.

Almost as common as the preceding species.

VERTIGO, Müller.

I have paid but very little attention to this genus so can only give the records, with a few exceptions, of previous workers.

Vertigo antivertigo, Drap.

5. Bicester.—Weston-on-the-Green, Rev. A. Matthews. (Norman, 1857).

Vertigo edentula, Drap.

5. Bicester.—Weston-on-the-Green, Rev. A. Matthews. (Norman, 1857).
6. Oxford.—Seems to have been well recorded from this district.

Vertigo pygmæa, Drap.

1. Banbury.—(Stretch, 1855).
6. Oxford.—(Norman, 1853). (Whiteaves, 1857). (S. Spencer Pearce, 1883).

Vertigo pusilla, Müll.

1. Banbury.—(Stretch, 1855). Rare.
6. Oxford.—Local. (Dalton, 1855). (Norman, 1857). (Whiteaves, 1857). (S. Spencer Pearce, 1883).

BALEA, Prideaux.

Balea perversa, L.

A common species and well distributed.

CLAUSILIA, Drap.

Clausilia **rugosa**, Drap.

Abundant in all the eight districts. When kept in confinement I have noticed that they generally suspend themselves by means of a short thread, about an inch in length, which is attached to the sides of the jar or box in which they are kept.

Var. **everetti**, Miller.

6. Oxford.—"Plentiful with the type" (S. Spencer Pearce, 1883).

Var. **gracilior**, Jeff.

There is a single specimen in the Whiteaves Collection.

Var. **tumidula**, Jeff.

6. Oxford.—Islip (S. Spencer Pearce, 1883).

Var. **parvula**, Turton.

6. Oxford.—Near Stow Wood (Whiteaves, 1857).

Var. **dubia**, Drap.

1. Banbury.—Common.
3. Wychwood and Charlbury.—Stonesfield.
6. Oxford.—Common.

Clausilia **rolphii**, Gray.

This, perhaps the rarest species in Oxfordshire, has only been found once. The Rev. S. Spencer Pearce writes in his list of 1883: "I am able to record a new locality for this species, which is more frequently found in the Southern counties. While searching under a hawthorn hedge near the village of South Hincksey, in the early spring of 1880, I came upon first one, and then several others of this species. On comparing them with Surrey specimens in my cabinet they proved exactly similar in all points excepting colour, the Berkshire specimens being of a darker tawny brown. It must, I think, be put down as rare, as I have failed to find it again, either in the locality just mentioned or in any other in the vicinity."

Clausilia **laminata**, Mont.

Not a common or plentiful species.

3. Wychwood and Charlbury.—Stonesfield (Whiteaves, 1857).
6. Oxford.—Not common. (Dalton, 1855). (Whiteaves, 1857).

COCHLICOPA, Férussac.

Cochlicopa tridens.

Local, and only sparingly met with.

6. Oxford.—Headington Quarry (Dalton, 1855). (Whiteaves, 1875). Not very plentiful (S. Spencer Pearce, 1883).

Cochlicopa lubrica, Müll.

A common and well distributed form.

CŒCILIANELLA, Bourg.

Cœcilianella acicula, Müll.

Not a rare form, but requires well looking for.

1. Banbury.—Broughton (Stretch, 1855). In a marlstone quarry (Pidgeon, 1875).
2. Deddington.—Near to Deddington, 1887.
6. Oxford.—Norman, (1853). (Dalton, 1855). (Whiteaves, 1857).

CARYCHIUM, O.F., Müll.

Carychium minimum, Müll.

A fairly common form, and seems to be well distributed.

CYCLOSTOMA, Drap.

Cyclostoma elegans, Müll.

Common, especially in the calcareous districts.

ACME, Hartmann.

Acme lineata, Drap.

"After many searches for this rare species, I discovered five specimens among moss growing on a clump of *Carex paniculata*, by a stream running through the boggy swamp at the foot of Well Copse." (S. Spencer Pearce).

Although I have searched most carefully, in different parts of the county, I have not as yet had the good fortune to meet with this species.

SPHÆRIIDÆ.

It is much to be regretted that so little attention has been paid to this family by English conchologists. With the exception of Jenyns' work, and a few scattered writings of various authors, little or nothing has been written by our own countrymen. Why this is so it is difficult to say—the *Sphæriidæ* present quite as many points of interest as any other family, and are an exceedingly variable one. A careful study of the variation alone, would well repay whatever time and trouble were given. A large number of varieties of both *Sphærium* and *Pisidium* have been described by American and continental conchologists, a number of which will no doubt be found to occur in our own country.

Although such diversity of opinion exists amongst the students of this family, hardly any two agreeing as to the limits of specific range, much might be done to place their nomenclature in a better and more satisfactory condition. Mr. H. E. Quilter, of Leicester, is, I understand, devoting some little attention to comparing a number of fossil forms with recent ones, and would be very pleased to receive the loan of any forms he does not possess.

The life-history has not, that I am aware of, been worked out by anyone. I have made some attempts at breeding them, but they have as yet proved anything but satisfactory.

The following observations on *Sphærium corneum* may possibly be of interest:

"In Dr. Jeffrey's 'British Conchology,' p. 15, Vol. I., there appears an extract from a letter received from Dr. Lukis, of Guernsey, referring to the habits of the *Sphæriidæ*. In speaking of *corneum* as a thread-spinner, Dr. Lukis says: '*Cyclas cornea* is much less active or inclined to ascend the glass; in fact, I have not seen it accomplish the feat.' I have for some short time kept a number of this species, and have found it quite the reverse of the above. One specimen which I noted carefully spun in the space of four hours three distinct threads, from $2\frac{1}{2}$ to 3 inches in length; another spun two, about 3 inches long, in about two hours and a-half. Dr. Lukis, states that it took *S. lacustre* three hours to spin a thread one inch in length. This statement cannot apply generally to the *Sphæriidæ*, as I have at least a dozen separate observations recording threads of $2\frac{1}{2}$ to 4 inches, none of which took more than seven hours to spin" (Science Gossip, June 1890, p. 140).

SPHÆRIUM, Scopoli.

Sphærium corneum, L.

Very common and well distributed throughout the county.

Var. **flavescens**, M'Gill.

Fairly common; generally found with type.

Var. **scaldianum**, Norman.

Thames at Clifden Hampden. (J. G. J., B. C.).

Sphærium rivicola, Leach.

An abundant and well-distributed form.

Sphærium ovale, Fér.

Scarce and local. In the autumn of 1889 I collected three specimens in a ditch in a field near to Broughton Castle. They were small specimens but undoubtedly *S. ovale*. The Rev. S. Spencer Pearce records a single specimen, dead, in good condition, valves united, from the canal near Wolvercot.

Sphærium lacustre, Müll.

Though never occurring in any abundance, it is well distributed over the county.

PISIDIUM, C. Pfeiffer.

Pisidium amnicum, Müll.

This, the largest of our Pisidia, occurs throughout the county in great abundance.

Pisidium fontinale, Drap.

Fairly common.

1. Banbury.—Abundant in River Cherwell.
3. Wychwood and Charlbury.—Common.
5. Bicester.—Weston-on-the-Green, Rev. A. Matthews (Norman, 1857).
6. Oxford.—Common.

Var. **pulchellum**, Jenyns.

5. Bicester.—Weston-on-the-Green, Rev. A. Matthews (Norman, 1857).
6. Oxford.—Common, numerous records.

Var. **henslowanum**, Shep.

1. Banbury.—Two or three from the Moat at Broughton Castle (Stretch, 1855).
6. Oxford.—Recorded by Whiteaves in 1857 as abundant; occurs in the district, but is much rarer now.

Pisidium pusillum, Gmelin.

Common, and well distributed.

Var. obtusale, Lam.

6. Oxford.—Stream near Botley (Whiteaves, 1857), (Dalton, 1855).

Pisidium nitidum, Jenyns.

Not at all common, and very sparingly met with.

1. Banbury. — Hanwell (Stretch, 1855), near Banbury, three specimens, 1887.
6. Oxford. — Very rare (Whiteaves, 1857), rare (S. Spencer Pearce, 1883).

Pisidium roseum, Scholtz.

I have had a number of specimens submitted to me named *P. roseum*, but all have, on careful examination, proved to be *P. nitidum*. As yet, there is no satisfactory record of this species having occurred in Oxfordshire.

UNIONIDÆ.

UNIO, Philippson.

Unio tumidus, Phil.

Fairly common in the Rivers Cherwell and Isis, and the Oxford and Birmingham Canal. "In 1854," says Mr. Whiteaves, "there was a great mortality of this (?) species, occasioned by drought, and by rats devouring them; the banks of the Cherwell were lined with their shells." Mr. Whiteaves seems, however, to have confused the present species with *pictorum*, and all his notices under *tumidus* apply with equal force to the species *pictorum*, which is the commoner of the two forms. *Unio pictorum* is not mentioned in the list, though it appears in the collection in the University Museum (S. Spencer Pearce).

Unio pictorum, L.

Plentiful in same localities as the preceding species, as are also the varieties *radiatus*, Moq., and *rostratus*, Brown.

Var. latior, Jeff.

6. Oxford.—Abundant in the canal (S. Spencer Pearce), (J. G. J., B. C.).

ANODONTA, Cuvier.

Anodonta cygnæa, L.

Occurs in great abundance, often attaining a large size.

Var. **rostrata,** Rossm.

6. Oxford.—One specimen in the river opposite Port Meadow (Norman, 1853), (Whiteaves, 1857).

Var. **cellensis.**

6. Oxford.—Railway Lake near Wolvercot (Whiteaves, 1857).

Var. **intermedia,** Pfr.

6. Oxford.—Near South Hincksey (Whiteaves, 1857).

Anodonta anatina, L.

Quite as common as the preceding species, with which it is generally found.

DREISSENIDÆ.

DREISSENA, Van. Ben.

Dreissena polymorpha, Pallas.

Exceedingly abundant in the canal; also occurs in the Cherwell.

NERITIDÆ.

NERITINA, Lamarck.

Neritina fluviatilis, Linné.

I have only obtained this species from two of the divisions, as under:—

1. Banbury.—River Cherwell (Stretch, 1855). On Stones in Cherwell (Pidgeon, 1875).

6. Oxford.—Numerous records, plentiful in the river.

PALUDINIDÆ.

PALUDINA, Lamarck.

Paludina contecta, Millet.

Not at all plentiful, and only small specimens.

1. Banbury.—Few in River Cherwell.

6. Oxford. — (Whiteaves, 1857). Very abundant in ditches around Oxford. (S. Spencer Pearce).

Paludina vivipara, L.

Fairly common, and well distributed. Occurs in large numbers in the canal.

BYTHINIA, Gray.

Bythinia tentaculata, Linné.

An exceedingly abundant and well-distributed form.

Bythinia leachii, Sheppard.

Not at all plentiful, and somewhat local.

1. Banbury.—(Stretch, 1855), (Pidgeon, 1875). Occurs sparingly in the canal and river.
6. Oxford. — Rare (Norman, 1853), (Dalton, 1855). Very common (Whiteaves, 1857). Local and rather scarce (S. Spencer Pearce, 1883).

VALVATIDÆ.

VALVATA, Müll.

Valvata piscinalis, Müll.

Abundant wherever it occurs. The records, which are numerous, are confined to districts Nos. 1, 3, and 6.

Valvata cristata, Müll.

A very common and well-distributed species.

(To be continued.)

CONCHOLOGICAL AND LEARNED SOCIETIES.

THE CONCHOLOGICAL SOCIETY, LEEDS.

May.—Mr. J. W. Taylor, F.L.S., in the chair.

A series of admirable drawings, illustrative of the anatomy of the British slugs, made by Mr. Charles Ashford, of Christchurch, Kent, were shown. No papers were read, the evening being devoted to the exhibition of specimens, which were numerous and interesting. Mr. John Ponsonby, F.Z.S., presented a number of shells to the Society's collection. The donations also included *Clausilia itala*, from Lake Como, and *Testacella haliotidea*, from Aylsham, Norfolk, given by the Rev. S. Spencer Pearce, M.A., the last-named from

Uxbridge, Middlesex, given by Mr. C. H. Morris; a couple of thickened examples of *Anodonta cygnea*, found in the Old Nidd stream, near Ripley, by Mr. A. H. Pawson; and a number of shells sent by Mr. T. D. A. Cockerell, which included various shells from Colorado, New Caledonia, Petersfield, Hants, and Poole, Dorsetshire, and examples of the common *Helix rotundata* from the great Skellig, off the coast of Kerry. The general exhibits included nine species sent by the Rev. T. Shankland, of Mold, Flintshire, as having hitherto not been recorded for that county, viz., *Vitrina*, *Helix aculeata*, *H. hortensis*, *H. arbustorum*, *H. hispida*, *H. rupestris*, *Bulimus obscurus*, *Balea*, and *Azeca*, which raises the Flintshire list to 35. *Helix vermiculata* was shown on behalf of Mr. L. E. Adams as purporting to come from Kent, but Mr. Adams considered the evidence unsatisfactory. The Rev. H. Milnes, of Winster, Derbyshire, sent some fine examples of the varieties of *Helix arbustorum* from that place.—*Yorkshire Post.*

MANCHESTER CONCHOLOGICAL SOCIETY.

June 11th.—Mr. Thos. Rogers in the chair.

Mr. R. Standen showed some living specimens of *Testacella scutulum*, taken in Lancashire, and sent for exhibition by Mr. W. H. Heathcote, of Preston. Mr. Heathcote, in an interesting note accompanying the specimens, said that he was of opinion that this slug may be much more common than is generally supposed, as, owing to its nocturnal and subterranean habits, it can easily elude observation. *Testacella* was noted as occurring at Crumpsall many years ago, by a Manchester naturalist, and the late Mr. Edward Kirk, of Pendleton, also observed it in a garden at Red Scar, near Preston, in 1878, but subsequent searches in these localities have failed to re-discover it; so that the recent authenticated find at Forton makes a valuable addition to the county list of Mollusca.

Messrs. W. Moss and R. Cairns exhibited a fine series of *Unio pictorum* from the canal at Marple, showing much variation in form and colouring, most of them, instead of the usual pearly nacreous interior, had the inside of the valves a beautiful salmon colour, which is very unusual. *Unio tumidus*, *Paludina vivipara*, *Pisidium amnicum*, *A. anatina*, *A. cygnea*, and a many other species were obtained.

Mr. Thomas Hey, of Derby, exhibited some living specimens of the very local *Achatina acicula*, obtained by him a few days previously in Monsal Dale; also some unusual forms of various species of *Helix* from several localities in Derbyshire.

Mr. Charles Oldham exhibited a collection of about 100 species of *Achatinella* from the Sandwich Islands; also *Helix nemoralis* from various places.

Some unusual forms of *Helix nemoralis* were shown from South Devon by Mr. L. Byne; and a set from Hoylake, Cheshire, taken by Mr. J. Ray Hardy. Mr. Thomas Rogers showed some curious examples of normally sinistral species of foreign land and aquatic shells of considerable interest.

July 6th.—Mr. Edward Collier in the chair.

Mr. Standen, the Honorary Secretary, read a report of the Society's excursion to Lostock Gralam, on June 20th, giving details of the Mollusca observed. The party were under the leadership of Mr. J. Grafton Milne, and had a pleasant ramble round by Budworth to Marston Forge. The ponds along the route were found to be very barren in molluscan life, the mud being so foul that no bivalve shells could exist, and only one species, *Sphærium lacustre*, was taken during the day. *Limnæa auricularia* and *Planorbis nitidus* were the most notable captures in fresh-water species. A wood at Marston proved to be the best hunting-ground, where *Zonites nitidus*, *Z. fulvus*, *Succinea putris*, and an albino specimen of *Helix rotundata* were found. Altogether twenty-six species were collected, a somewhat meagre list for what seemed rather a promising locality, but it was the general opinion that the close proximity of Northwich, and consequent smoky deposits upon the herbage, probably accounted for the scarcity of the land shells, as is the case in the district around Manchester. Mr. Standen exhibited some of the shells taken during the excursion, and also some specimens of *Helix elegans* from Dover. This pretty little continental species has apparently become acclimatised there, and there is a flourishing colony in one locality, but there is a strong belief that it has purposely been introduced by some unknown naturalist.

Mr. R. Cairns showed some albino *Planorbis contortus*, and specimens of *Planorbis nitidus* recently taken at Marple, which are additions to the previous lists of species from that locality.

Mr. W. Moss showed *Helix virgata* var. *picta*, and *Valvata piscinalis* var. *albida*, from Lewes, Sussex; and some extremely pretty varieties of *Helix nemoralis* and *Helix arbustorum*, from Dovedale, Derbyshire.

Mr. Charles Oldham exhibited some fine *Pisidium pussilum* from Penistone, and *Pisidium roseum*, *nitidum*, and *fontinale*, from several localities about Rhos, Neigir, Anglesea.

Mr. Edward Collier showed some varieties of *Helix arbustorum*

and *Trocatella regima*, from Cuba; *Caracolla patina*, from Jamaica; and *Physa scalaris*, from Lake Apopka, Florida, which is a singular shell, being a connecting link between the widely dissimilar genera of *Physa* and *Planorbis*, and excited much interest and comment, as it was quite new to all present.

Mr. Henry Hyde showed some mounted specimens which he recommended as being useful for class teaching purposes.—*Manchester City Press.*

ZOOLOGICAL SOCIETY OF LONDON.

June 2nd.—Prof. W. H. Flower, C.B., LL.D., F.R.S., President, in the chair.

A communication from Dr. O. F. Moellendorff was read, which contained a revised list of the Land and Freshwater Shells of Perak, and descriptions of some new species.

June 16th.—Dr. St. George Mivart, F.R.S., Vice-President, in the chair.

Mr. Edgar A. Smith described a large collection of Marine Shells from Aden, and made some remarks upon the Molluscan Fauna of the Red Sea and their relationship with that of the Mediterranean. Some new species of shells, based on examples obtained during the "Challenger" Expedition were also described by Mr. Smith.

BIBLIOGRAPHY.

Annals and Magazine of Natural History.

JULY.

On the Development of the Chromatophores of Octopod Cephalopoda.—L. Joubin.

AUGUST.

On the Molluscan Genera *Cyclostoma* and *Pomatias*.—Rev. Canon A. M. Norman.

SEPTEMBER.

Remarks upon the Genus *Pythina* of Hinds and the species which have been referred to it, upon *Mysella* of Angas, and the description of a new species of *Mylitta*.—Edgar A. Smith.

Description of nine new Terrestrial and Fluviatile Mollusks from South Africa.—James Cosmo Melvill, M.A., F.L.S., and John H. Ponsonby, F.Z.S.

A List of the Land and Freshwater Shells of Barbados.—Edgar A. Smith and Col. H. W. Feilden.

Space does not permit us to detail the arguments of Canon Norman in favour of retaining the generic name *Cyclostoma*. We strongly recommend all interested in the subject to carefully read through his paper.

A most interesting account of the nineteen species of molluscs which have been placed in the genus *Pythina* is given by Mr. Edgar A. Smith, who considers only one of the nineteen has any claim to be termed *Pythina*, viz., *P. deshayesiana* Hinds. Of the remainder, four he would place amongst the *Mylitta*, three in *Kellia*, seven in *Tellimya*, three in *Montacuta*, and one in *Lepton*.

Respecting the genus *Mysella*, "which was created by Angas for a small Australian bivalve," and described in the Proc. Zool. Soc., 1877, p. 176, Mr. Smith points out inaccuracies in the original description, and after a careful study of the types *M. anomala* and *M. donaciformis* he fails to see any reason for separating them from the genus *Tellimya*.

Myletta auriculata is a new species described from three valves from Tasmania.

Messrs. Melvill and Ponsonby describe eight new land molluscs and one freshwater from South Africa, viz. : six *Helicidæ*, one *Vertigo*, one *Cyclostoma*, and one *Pisidium*.

A List of the Land and Freshwater Molluscs of Barbados, enumerating thirty-one species, is contributed by Messrs. Smith and Feilden.

British Naturalist.

SEPTEMBER.

Molluscan Captives.—W. A. Gain.

Mr. Gain describes the method he has adopted for keeping molluscs in confinement, and gives a number of interesting notes about various species.

Naturalist.

SEPTEMBER.

Y.N.U. at Grassington : Conchological Section Report.—William Nelson.
Extracts from a Conchologist's Note-Book.—William Nelson.

Mr. Nelson contributes an interesting report of the Yorkshire Naturalists' Union Excursion to Grassington, giving a total list of 33 species, of which three were slugs, three freshwater, and the remainder land. *Vertigo edentula* and *Hyalina pura* were added to the present known species of the district.

Science Gossip.

JULY.

The Chitinous Plug in Mollusca.—J. W. Williams.
Hydrobia jenkinsi in Essex.—Walter Crouch.
Hydrobia jenkinsi.—W. H. Smith.
Snails as a Cure for Consumption.—Edmund Rundle, F.R.C.S.I.
A Subscalarid Monstrosity of *Helix rufescens*.—J. W. Williams.

AUGUST.

Hydrobia jenkinsi.—H. J. Jenkins.
Arion ater.—F. W. Wotton.
Snails as a Cure for Consumption.—Fred. H. Davey.

SEPTEMBER.

On the Burrowing Habits of the Genus *Testacella* Cuvier.—C. D. Horsman, B.A.
Conchological Society's Journal.—Mary Heitland.

The career of *Hydrobia jenkinsi* has so far been one of controversy and discussion. This new addition to the British List was named by Mr. Edgar A. Smith in 1889, and described in the "Journal of Conchology," Oct. 1889, p. 142. Mr. J. T. Marshall, whose opinion is always worthy of deep consideration, con-

siders it only as a variety of *H. ventrosa*, viz., var. *ovata*. Mr. W. H. Smith, writing in the "Essex Naturalist" and "Science Gossip," says: "It is due to the energy of Mr. W. Allen that this species became known to Mr. Crouch . . . I think *Hydrobia alleni* would be a more commendable name than *Hydrobia jenkinsi*." Mr. Crouch and Mr. Jenkins both reply, which can leave no doubt that they were the active workers in establishing the new form. The naming of shells after individuals is a practice to be strongly deprecated, and we must confess we were surprised that so eminent an authority as Mr. E. A. Smith should countenance such a practice.

NOTES AND QUERIES.

Molluscan Parasites.—Very little, I believe, has been written on the subject of Molluscan Parasites, and yet the subject is one of great interest. I write these few notes hoping that some conchologists may be able to add to our present knowledge. The *Philodromus limacum* of Jenyns is well known to all conchologists, but there is a species I have often found on *Helix arbustorum* which seems to differ from this. On a number of the *Limnæidæ* I have often noticed a worm-like parasite; some Mr. W. E. Collinge sent me appear to differ from those I have generally found; careful examination may prove them to be another species. Mr. Collinge also sent me a number of parasites found on *Arion ater*, which were certainly not *Philodromus limacum*. They unfortunately came to grief in course of transit, but he hopes to be able to obtain more, which will be duly described in the pages of "The Conchologist."—J. GALTON.

Literature on the Sphæriidæ.—Will any of your readers kindly give me a list of the principal writings on the life-history, anatomy, and variation of this family?—THOS. R. WALKER.

Illustrations of Varieties.—Can any of your readers inform me where I can find illustrations of the following varieties:—*Limnæa palustris* var. *tincta*, Jeff., *L. truncatula* var. *ventricosa*, Moq., and *Helix arbustorum* var. *conoidea*, Westrl.—J. E. MAUD.

ANSWERS TO CORRESPONDENTS.

All communications intended for publication must be authenticated with name and address of sender.

J. W.—We thank you for your letter and good wishes. We may treat of the subject you name in future numbers.

J. F. B.—The slugs received are all *Arion ater*, with a number of the variety *rufa*. We thank you for the same.

C. M. N.—We should recommend glass-top boxes for the type collection, and glass tubes for the remainder.

L. B. T.—The list you require was published in the "Zoologist," p. 4022, 1853.

W. E. M.—You will find the "Science Gossip" the best paper for what you require. It has a very large Colonial and foreign circulation. Nearly all the back numbers can still be had.

A. T. H.—There are a number of mediums you might make experiments with. Try the following:—(1) Equal parts of glycerine and methylated spirit. (2) Water, 800 parts; chloride of zinc, 100 parts; dissolve.

REV. T. S.—Thanks for your promise and interesting list.

THE CONCHOLOGIST:

A Quarterly Magazine for Conchologists.

Vol. I. DECEMBER 24th, 1891. No. 4.

REVIEW.

THE GENUS LATIRUS (MONTFORT).

BY J. COSMO MELVILL, M.A., F.L.S. (Manchester, 1891).*

WE have pleasure in noticing this most interesting and useful little monograph on the genus *Latirus*, written with a lucidity and elegance that characterise all the writings of Mr. Melvill. In the space of 48 pages the author reviews the (i.) Early History and Classification; (ii.) General Characteristics; (iii.) Existing Monographs; (iv.) Derivation of Name; (v.) Fossil Forms; (vi.) Classification and Dentition, &c., &c. Mr. Melvill suggests as a possible derivation of the word *Latirus*, the word *lateritius*, "of or belonging to a brick, from the warm, sun-dried brick colour of some species, especially the type, *L. Gibbulus* (Gmelin)"—spelt in all the editions of Woodward's Manual, in both letter-press and plate-references, *Gilbulus*. The dentition seems to claim a prominent place in the history of this genus and its allies. In fact, there is an unusual dependence upon it for the purpose of both generic and specific distinction. "Mr. Cooke considers the dentition sufficiently distinct in *Peristernia* to keep that genus distinct from *Latirus;* but he has examined only four species of the genus."† We agree with Mr. Melvill that "it is very

* An Historical Account of the genus *Latirus* (Montfort) and its dependencies, with descriptions of Eleven new species, and a Catalogue of *Latirus* and *Peristernia*, by James Cosmo Melvill, M.A., F.L.S. (Mem. and Pro. of the Manchester Lit. and Phil. Soc., Manchester, 1891).

† Mr. Melvill gives a list of 49 known species.

difficult to draw a hard and fast line, unless the odentophore of each is known and examined." While recognising the importance of the dentition as a valuable aid in classifying, to make it the basis of a classification is about as absurd as the old idea of relying entirely upon the shell. Is there no account of the anatomy of any of these generæ? Speaking of the irridescent epidermis in some species, Mr. Melvill writes:—"In three or four species the epidermis, when wetted or oiled, shows prismatic reflections. I do not know this peculiarity in any other genus, nor does it exist in many *Latiri*. It is most conspicuous in the still uncommon *L. prismaticus* of Martyn, who, under its old title, *Buccinum prismaticum*, figured it in his 'Univ. Conch.,'" vol. 11, p. 2 . . . "I have often noticed, in deep tidal ponds around our coasts, and likewise in those of other countries, certain marine Algæ, appearing beautifully prismatic in the water, steel-blue or sea-green being the prominent reflections, the effect of which vanishes, however, entirely and immediately they are withdrawn from their native element into the open air. Such are the British *Rhodymenia palmata* (Grev.), and, above all, *Nitophyllum laceratum* (Grev.), *Chondrus crispus* (Lyngbye), and *Cystoseira ericoides* (Agardh). It is possible that the *Latirus prismaticus*, and other species with irridescent epidermis, feed exclusively on Algæ possessing this peculiarity, and so a colour resemblance has been given them for purposes of protection. This seems not an improbable theory." The eleven new species described are as follows:—*Latirus Eppi*, *L. formosior*, *Peristernia mannophora*, *P. hilaris*, *P. canthariformis*, *P. cremnochione*, *P. Smithiana*, *P. retiaria*, *P. leucothea*, *P. Selinæ*, *P. Iniuensis*. We cannot refrain from protesting against this system—which seems to be on the increase—of naming shells, &c., after individuals or places. Surely some leading characteristic feature in the shell or animal would suggest a more rational and scientific nomenclature. A catalogue of *Latirus* and its immediate allies, and a plate of figures of the new species and others, completes this interesting memoir, which reflects great credit on both the Society from whose proceedings it is reprinted and the author.

DR. SCHARFF'S FIGURES OF IRISH SLUGS.

By T. D. A. COCKERELL, F.Z.S.

I HAVE just received the beautiful work on Irish Slugs, by Dr. Scharff, published in the *Transactions of the Royal Dublin Society*. On pl. lvi., he figures a number of varieties, but gives only the

specific names. I have tried to identify these, and the result is as follows:—

PLATE LVI.

Fig. 1.—**Limax maximus** form **obscurus**, Moq.
Fig. 2.—**Limax maximus** form **vulgaris**, Moq.
Fig. 3.—**Limax flavus** form **flavus** (Moq.).
Fig. 4.—**Limax marginatus** var. **decipiens** (Ckll., 1886).
Fig. 6.—**Agriolimax agrestis** var. **griseus** (Ckll., 1889).
Fig. 9.—**Amalia gagates** sub-sp. **plumbea** var. **rava** (Wllms.).
Fig. 10.—**Arion empiricorum** var. **rufus** ("Linn.").
Fig. 11.—**Arion empiricorum** var. **fasciatus** (Ckll., 1889).
Fig. 12.—**Arion empiricorum** var. **fasciatus** (Ckll., 1889).
Fig. 15.—**Arion empiricorum** var. **bicolor** (Moq.).
Fig. 16.—**Arion empiricorum** var. nov., allied to the Portugese var. **bocagei**, Simroth.
Fig. 18.—**Arion subfuscus** var. **succineus** (Bouill.).
Fig. 19.—**Arion subfuscus** var. **aurantiacus** (Ckll., 1886).
Fig. 20.—**Arion hortensis** var. **subfuscus** (C. Pfr.).
Fig. 21.—**Arion circumscriptus** var. **neustriacus** (Mabille).
Fig. 24.—**Geomalacus maculosus** var. **allmani**, Heynemann.

I follow Pollonera in writing *A. empiricorum*, but doubt whether our species is more than subspecifically distinct at best from the Linnean *ater*. Figures 11, 12, and 16 are specially interesting as approaching Portugese forms, the striped variety suggesting *A. lusitanicus*. Figures 18 and 21 are new to the British Isles. I think I have Fig. 20 rightly named, but superficially it is not unlike *A. mollerii*, Poll., or Simroth's light variety of *A. pascalianus*.

Institute of Jamaica, Kingston, Jamaica,
October 18th, 1891.

THE LAND AND FRESHWATER MOLLUSCA OF OXFORDSHIRE.

By W. E. COLLINGE.

(*Continued from page* 67.)

LIMNÆIDÆ.

PLANORBIS, Gnett.

Planorbis fontanus, Lightfoot.

= ***nitidus***, Auctt.

Local and not at all plentiful.

1. Banbury.—Very scarce on the River Cherwell (Pidgeon, 1875), (Stretch, 1855).
2. Oxford.—Two or three specimens in a ditch in Christchurch Meadow (Norman, 1853). Rather rare (S. Spencer Pearce, 1883).

Planorbis nautileus, L.

Sparingly met with in the Cherwell near Banbury and adjacent ponds. The Rev. S. Spencer Pearce in 1883 also recorded it from the canal between Wolvercot and Oxford.

Planorbis albus, Müll.

Not an uncommon species, but by no means plentiful.

1. Banbury.—River Cherwell (Pidgeon, 1875).
2. Deddington.—Few specimens in ponds.
5. Bicester.—Two or three specimens from ditch near Bicester.
6. Oxford.—Not common (Norman, 1853). Rather rare (Dalton, 1855). Sparingly though generally distributed (S. Spencer Pearce, 1883).

Planorbis spirorbis, Müll.

Somewhat local, but generally met with in large numbers.

1. Banbury.—(Stretch, 1855). Scarce in the Canal. (Pidgeon, 1875). Plentiful in the River Cherwell.
6. Oxford.—Ditch at the side of Cowley Marsh (Norman, 1853), (Dalton, 1855). Plentiful in ditches (S. Spencer Pearce, 1883).

Planorbis vortex, L.

A common and generally distributed species.

Planorbis carinatus, Müll.

Plentiful and well distributed, preferring ponds and ditches to the rivers.

Var. disciformis, Jeff.

6. Oxford.—J.G.J., B.C.

Planorbis umbilicatus, Müll.

= *complanatus*, Auctt.

Abundant throughout the county.

Planorbis corneus, L.

Abundant and well distributed; very fine in some parts of the county.

Planorbis contortus, L.

Well distributed, but not plentiful.

PHYSA.

Physa fontinalis, L.

A common and well-distributed form.

Physa hypnorum, L.

Very local.

1. Banbury.—River Cherwell very scarce (Pidgeon, 1875).
6. Oxford.—Very local (Norman, 1853), (Dalton, 1855). Locally abundant (S. Spencer Pearce, 1883).

LIMNÆA, Lam.

Limnæa glutinosa, Müll.

Dalton (1855) records a single specimen from a ditch at South Hinksey.

Limnæa peregra, Müll.

Abundant throughout the county.

Var. ovata, Drap.

1. Banbury.—Occasionally found in the canal.
6. Oxford.—A ditch near West Hinksey (Norman, 1853). Common, of large size in the canal (S. Spencer Pearce, 1883).

Var. acuminata, Jeff.

6. Oxford.—(Norman, 1853), (S. Spencer Pearce, 1883).

Var. lineata, Bean.

1. Banbury.—(Stretch, 1855).

Limnæa auricularia, L.

Common, and well distributed.

Limnæa stagnalis, L.

Abundant, and well distributed.

Var. fragilis, L.

A common form.

Limnæa palustris, Müll.

Well distributed throughout the county.

Limnæa truncatula, Müll.

Very common, and well distributed. Thomas has well described its habits and habitat in Quar. Jour. Micro. Sci., vol. xxiii., 1883.

Limnæa glabra, Müll.

6. Oxford.—Ditch near Kennington, rare (Dalton, 1855).

ANCYLUS, Geoff.

Ancylus fluviatilis, Müll.

Not at all plentiful, but well distributed. In Gray's edition of Turton's Manual (1848), on page 248, it is stated that "these animals sometimes swim about on the surface of the water like Limnæi, with their backs downwards." I have never seen either of the members of this genus float, and I have turned hundreds into the position described, and have always found that if in sinking they did not resume their normal position, they all, without exception, died.

Ancylus lacustris, L.

More plentiful than the preceding species, but not so widely distributed.

ADDENDA.

Limax cinereo-niger, Wolf.

Var. verus, D. & M.

(Young specimen).

Limax marginatus, Müll.

= *L. arborum*, B.-Ch.

Var. nemorosus, Bandon.

(Three specimens).

Mr. Cockerell informs me that "there are in the British Museum four slugs from near Oxford, collected by A. M. Norman" as above.

LIST OF WRITINGS ON OXFORDSHIRE MOLLUSCA REFERRED TO.

1834.—Strickland, H. E. "A list of some Land and Freshwater species of shells which have been found in the Neighbourhood of Henley-on-Thames." Loudon's Mag. of Nat. Hist., vol. viii., p. 494, 1834.

1853.—Norman, Alfred Merle. "Land and Freshwater Mollusca of Oxford and its Neighbourhood." Zool., vol. xi., p. 3761, 1853.

1853.—Norman, Alfred Merle. "Notes on the Oxfordshire Shells." Zool., vol. xi., p. 4127, 1853.

1855.—Stretch, Richard. "List of the Land and Freshwater Mollusca found in the Neighbourhood of Banbury, Oxfordshire." Zool., vol. xiii., p. 4540, 1855.

1855.—J. D[alton]. "Land and Freshwater Shells in the vicinity of Oxford." Morris' Naturalist, vol. v., p. 200, 1855.

1856.—Gray, J. E. (Sph. Pisidiodes.) Ann. and Mag. Nat. Hist., July, 1856.

1857.—Whiteaves, J. F. "On the Land and Freshwater Mollusca inhabiting the Neighbourhood of Oxford." Republished in pamphlet form from the Trans. of the Ashmolean Soc., Oxford, 1857.

1857.—Norman, Rev. Alfred Merle, B.A. "Notes on the Oxfordshire Shells." Zool., vol. xv., p. 5609, 1857.

1869.—Stubbs, C. E. "Land and Freshwater Mollusca collected in the immediate vicinity of Henley-upon-Thames, during the season of 1868." Zool., p. 1836, 1869.

1875.—Pidgeon, D. "A List of the Land and Freshwater Shells found in the Neighbourhood of Banbury, Oxfordshire." Quar. Journ. of Conchy., vol. i., p. 54, 1875.

1882.—Potts, John. "Excursion to Stonesfield." MS. trans. of Banburyshire Nat. Hist. Soc. and Field Club.

1883.—Taylor, J. W., F.L.S. Journal of Conchology, p. 44.

1883.—Thomas, A. P., M.A., F.L.S. "The Life History of the River Fluke (Fasciola hepaticæ)." Quar. Journ. Micro. Sci., vol. xxiii., p. 99, 1883. (References to *Physa fontin-*

alis and *Limnæa truncatula*, with observations on the habits of the latter.)

1883.—Pearce, Rev. S. Spencer, B.A. "The Land and Freshwater Mollusca in the vicinity of Oxford." Zool., p. 327, 1883.

1885.—"Census of the Conchological Society," 1885.

1888.—Taylor, J. W., F.L.S. "On the specific distinctness and geographical distribution of *Testacella scutulum*." Journ. of Conchy., vol. v., p. 337, 1888. (Reference to *T. haliotidea* on p. 341.)

1890.—Collinge, W. E. "Description of a New Variety of *Limax flavus* var. *lineolatus*." Zool., p. 145, vol. xiv., 1890.

1890.—Collinge, W. E. "*Helix pisana* in Oxfordshire." Science Gossip, p. 92, 1890.

1890.—Collinge, W. E. "Observations on *Vitrina pellucida*." Zool., p. 467, vol. xiv., 1890.

1891.—Collinge, W. E. "Observations on the Burrowing Habits of Certain Land and Freshwater Molluscs." Naturalist, p. 75, 1891. (References to *P. contecta*, *P. vivipara*, and *By. tentaculata*.)

THE CONCHOLOGIST:

A QUARTERLY MAGAZINE FOR CONCHOLOGISTS.

"The Conchologist" is published on each quarter-day. Annual Subscription, 3s. 6d., post free. Single Copies, 10d. each.

All communications intended for publication, advertisements, and books, &c., intended for review, should be forwarded on or before the 1st of the month preceding publication, and addressed to

W. E. COLLINGE, *St. Andrews, N.B.*

DECEMBER 24th, 1891.

Editor's Notes.

WITH this number we complete the first volume of *The Conchologist.* Acting upon the suggestion of a large number of our subscribers, we have decided to issue Volume II. in a slightly different size, viz., demy 8vo, and to increase the number of pages to twenty-four. Twelve numbers will complete the volume.

To those subscribers who have given such hearty support during the past year, it will be gratifying to learn that the paper has continued self-supporting. The additional expense which will be incurred by its enlargement will, we trust, easily be met by an increase in the number of subscribers.

A CORRESPONDENT writes us suggesting the formation of a "Postal Conchological Society, from which members, on payment of a small fee, could borrow books, authenticated type specimens and varieties, microscopical preparations, &c." The idea is a good one and well worthy of consideration.

WE should like to call the attention of all conchologists interested in the distribution of the Mollusca, to the issue very shortly of "A Topographical List of the Local Lists of British Land, Freshwater,

and Marine Mollusca." This publication will, to a large extent, show the work that has been done in each county in the British Isles, prefaced by useful notes, &c.

It is desirable to make one edition suffice for some little time, and to aid in making the same as complete as possible, the editor earnestly asks for the assistance of at least one conchologist in each county. A list of those who have rendered assistance will be published with each county's records.

An important contribution to the literature of the mollusca has lately appeared in the "Transactions of the Royal Dublin Society," viz., Dr. Scharff's memoir on "The Slugs of Ireland," illustrated by two coloured plates. We trust it will give an impetus to Irish conchology.

CONCHOLOGICAL AND LEARNED SOCIETIES.

THE CONCHOLOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

September 2nd.—Mr. J. W. Taylor, F.L.S., in the chair.

Papers were read from Dr. Heinrich Simroth, of Gohlis, Germany, upon "Some Testacellæ;" and another by the Rev. J. E. Somerville on "*Achatina acicula*," in a Roman Cemetery at Ventimiglia, Italian Riviera. The exhibits were very numerous, including species of *Pisidium* from various localities, sent by Mr. Charles Oldham; *Limax cinereo-niger*, and other slugs, from Banffshire, sent by the Rev. Dr. Gordon; varieties of *Helix arbustorum* and *H. hortensis*, from Lancashire, sent by Mr. R. Wigglesworth; *Amalia gagates*, from Greece, sent by Mr. J. G. Milne; *Sphærium rivicola*, from Welshpool, sent by Mr. J. B. Morgan; *S. lacustre*, from a pond near Dunbar, sent by Mr. Thos. Scott, F.L.S.; the scalariform variety of *Helix arbustorum*, from Derbyshire, sent by the Rev. Herbert Milnes; examples of *Planorbis albus*, showing unusual sculpture, and photographs of *Pupa umbilicata*, by Mr. Wm. Nelson; a large number of Flintshire shells, sent by the Rev. T. Shankland; and a number of slugs from various localities, by Mr. W. Denison

Roebuck, F.L.S. Examples of Hampshire *Succineæ*, sent by Mr. Charles Ashford, were exhibited, who noted that the difficulty of separating *S. elegans* from *S. putris* vanishes on the examination of the animal, the anatomical differences being very marked. Mr. Taylor showed a number of shells, which had been determined for him by M. J. R. Bourguignat.

October 7th.—Mr. J. W. Taylor, F.L.S., in the chair.

The exhibits were numerous, the most interesting and important being that of examples of *Testacella scutulum* found at Headingley, by Mr. Edgar R. Waite, F.L.S. This exhibit was the more important inasmuch as these specimens are the first Yorkshire examples whose specific identification has been accurately placed on record. The Society's referees have never been able to obtain examples of those known to occur at Beverley and at Boston Spa, at all events since our developed knowledge of the specific differences of the animals of this genus has made it possible to determine for certain whether they are to be called *T. scutulum* or *T. haliotidea*. Mr. O. Marsden showed a slide of the lingual ribbon of *Arion ater*. A fine living example of *Amalia gagates* var. *rava*, from Crouch Hill, Middlesex, was shown on behalf of Mr. G. K. Gude, and on behalf of Mr. S. C. Cockerill examples of *Paludina contecta* and *P. vivipara* from Mantua, Northern Italy, with the remark that they are found together in great plenty, and the latter species nearly all as large as or larger than the one sent, which was over 52 millimetres in length. A large number of shells from Lamlash, Arran, and Dunblane, Perthshire, were shown on behalf of Mr. Alex. Shaw, of Glasgow, several being new records for the county from which they came. A large number of new county record shells from Flintshire, Carnarvonshire and Anglesea, sent by the Rev. Thomas Shankland, of Mold, were exhibited, including *Helix fusca*, *H. pygmæa*, *Zonites glaber*, *Planorbis albus*, *Pl. spirobis*, *Pl. contortus*, *Physa hypnorum*, &c., from various localities about Mold; *Amalia carinata* and *Limax flavus*, from Bangor; *Vertigo pygmæa* from Great Orme's Head, and from Penmon Point, Anglesea, &c., and a Welsh example of *Acme lineata*, whose locality was not stated, but of which rare (or rather seldom seen) mollusc this makes the first record for the Principality. Several shells were also shown on behalf of Mr. F. W. Frieke, of Hull. These included *Vertigo edentula* and *V. pygmæa*, from Speeton Cliffs, and the latter species also from Drenton Vale, and some examples of *Limnæa peregra* from the Wolds at Riplingham, where it swarms in the dirty-coloured water of a cattle-pond in which there is no vegetation or any other shell whatever; also examples of the castaneous variety of *Helix hortensis* from Cottingham, and of the

hyalozonate and roseolabiate variety of *H. nemoralis* from Burstwick, near Hull.

MANCHESTER CONCHOLOGICAL SOCIETY.

September 3rd.—Mr. R. D. Darbishire presided. Mr. E. H. Turner of Chorlton-cum-Hardy, was elected a member.

Mr. Standen, the honorary secretary, read reports of the society's excursion to the Peak Forest Canal on July 18th, and to Lathkill Dale, Derbyshire, on August Bank Holiday. Shell-hunting on the canal had not proved very productive, the water for a long distance being very foul. With the exception of *Sphærium rivicola*, all the commoner freshwater shells usually met with were very scarce, and the specimens poor. Some very small *Sphærium ovale* were found, but this fine species appears to be vanishing from the several localities around Manchester where it formerly abounded, which is easily accounted for by the increasing pollution of the canals. Several species of land shells were found in the little woods alongside the canal, the most notable being *Zonites nitidus* and *Zonites excavatus*. Altogether twenty species of Mollusca were observed. In Lathkill Dale some very fine varieties of *Helix nemoralis* and *H. arbustorum* were found, but not in as great quantity as might have been expected, probably owing to the presence of many hen-pens placed along the valley, the inmates of which no doubt pick up and devour the larger *Helices*. *Helix lapicida* was common on the walls, rocks, and trees, and *Helix ericetorum* occurred on a grassy slope. Several species of *Zonites* were taken, also *Carychium*, *Helix rupestris*, *Helix aculeata*, *Helix pygmæa*, and others. *Clausilia laminata* was plentiful on the trees, and specimens of *Vertigo edentula* were found on dead sticks in the woods. The day's collecting gave a total of twenty-eight species.

Mr. Thomas Rogers showed some *H. nemoralis* and *H. aspersa* from Tipperary, Ireland. A specimen of *Anodonta cygnea*, seven inches in length, from a pond at Baguley, was exhibited by Mr. Henry Hyde.

Mr. Darbishire showed specimens of *Unio margaritifer* from Teith River, Scotland. Messrs. W. Moss and R. Cairns exhibited a fine series of *Helix nemoralis* and varieties from the Isle of Man, and the latter gentleman showed a reversed, or sinistral, *Helix aspersa;* also a scalariform example of the same from the Isle of Man. Mr. Moss reported the finding of *Vertigo pygmæa* in an old quarry at Beerley, near Ingleton, where it lives in great numbers, and he showed about 200 specimens which he had collected there in a few hours' time.

Mr. J. C. Melvill exhibited a sinistral *Helix nemoralis* from

Chichester; a magnificent specimen of *Turbo splendidulus* from Mozambique, a recently named and most interesting addition to the genus *Turbo;* and some rare and remarkably beautiful deep-sea shells.

Mr. W. E. Hoyle exhibited a large number of the small New Zealand *Helices*, preserved with the animals in spirit, many of them being exquisitely sculptured and very beautiful.

At the conclusion of the formal meeting, Mr. Melvill threw open the doors of his cabinets of Land Mollusca, and the members enjoyed the privilege of looking through his drawers of beautiful and rare collections of *Helix*, *Bulimus*, *Clausilia*, *Achatinella*, *Cyclostoma*, and other genera. He also showed his extensive collection of the genus *Mitra*, which contains many unique types of species and is remarkably rich in colour forms of these much-admired shells.

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OCTOBER.

Notes on African Mollusca.—Edgar A. Smith.
Note on *Parmacellus gracilis*, Gray.—T. D. A. Cockerell.

In the January number of the "Ann. and Mag. of Nat. Hist." Mr. Cockerell described a specimen of *Ibycus fissidens* Heyn (=*sikkimensis* G. Aust.), from a specimen in the British Museum, entered in the accession book as *Parmacella olivieri* "purchased at Stevens." On comparing this description with that of *Ibycus gracilis* (Gray, 1855), Mr. Cockerell is of opinion that it is synonymous. The synonymy will therefore read as under :—

Ibycus gracilis (Gray, 1855),
= *I. fissidens* (Heyn, 1862),
= *I. sikkimensis* (G. Austen).

British Naturalist.

OCTOBER.

Molluscan Captives.—W. A. Gain.

NOVEMBER.

Molluscan Captives (*con.*).—W. A. Gain.
Notes on Decollate Shells.—Brockton Tomlin.
Bythinia tentaculata in the Erie Canal.

Mr. Gain's observations on Molluscan Captives are very interesting, and show a careful and painstaking piece of work.

An interesting paper is communicated by Mr. Brockton Tomlin respecting the decollation in *Clausilia*, &c. "Any conchologist," he writes, "scrutinising an old

wall in ordinary dry weather, must have noticed how conveniently for his purposes many of the *Clausilias* project from their coverts, the length of their shell rendering seclusion impossible. This results in the tip of the shell getting bleached (a constant phenomenon), and continued exposure would further tend to disintegration of the affected whorls, and finally to their disappearance; the animal taking part in the last stage, when his top storey had become dismantled and uninhabitable." Other species are mentioned, particulars of which will be found on reference.

Naturalist.

OCTOBER.

Y.N.U. at Hayburn Wyke: Report of Conchological Section.—Rev. W. C. Hey, M.A., and Lewis B. Ross, F.C.S.

Y.N.U. on the Wolds: Report of Conchological Section.—Lewis B. Ross, F.C.S.

NOVEMBER.

Y.N.U. in Edlington and Wadworth Woods: Report of the Conchological Section.—W. Denison Roebuck, F.L.S.

The Y.N.U. report for Hayburn Wyke gives a total of 28 species; that for the Wolds, 33 species; and for Edlington and Wadworth Woods, 22 species.

Science Gossip.

OCTOBER.

On the Burrowing Habits of the Genus *Testacella* Cuvier.—W. E. Collinge.

NOVEMBER.

Monstrosity of *Clausilia rugosa*.—H. Downes.

Preserving and arranging Shells.—C. P. Gloyne.

Mr. Downes records and figures a specimen of *Clausilia rugosa* having two mouths: "Both were sinistral, and of equal size, one forming the aperture of protrusion, and the other not communicating with the interior, but fully formed in every particular.

NOTES AND QUERIES.

The Conchological Society's Census.—When are we to have a new Census of the British Land and Freshwater Shells? This query I have often heard repeated by my friends who are interested in conchology. I think (and not alone) that another is badly required for two or three reasons. Allowing that the Census at the end of Mr. J. W. Williams' 1s. Manual of Land and Freshwater Shells is the last one, there are numerous alterations to be made in it. As conchology is so very rapidly becoming popular, the census ought to be kept up to date. During the past few months I have found the following which are not recorded in the Census for County No. 6, North Somerset:—

Limax maximus.—Common at Bratton St. Maur and the immediate district.

Helix fusca.—Extremely plentiful in a wood at Crawlands, near Bratton St. Maur; also common in hedgebanks at Milton Clevedon.

Helix aculeata.—Fairly plentiful at Holbrook, Bratton St. Maur.

Hyalina fulva.—Common in a wood at Crawlands, near Bratton St. Maur.

Also two species not recorded for County No. 15, or East Kent:—

Helix aculeata.—Common in woods and hedgebanks at Wychling, near Sittingbourne.

Hyalina crystallina.—Common in woods at Doddington, near Sittingbourne.

—E. W. SWANTON, Doddington, Sittingbourne.

Literature on the Sphæriidæ.—Mr. Walker may find some of the following references useful:—

BAUDON.—"Essai monog. sur les *Pisidies* Francaises." Paris, 1857.

BOURGUIGNAT.—"Mém. de la Soc. des Sci. phys. et nat. de Bordeux," 1854 (Essay on recent and fossil Sphæriidæ).

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GARNER.—"On the Anat. of the Lamellibr. Conchifera." Zool. Soc. Trans. Lond., Vol. ii., 1841.

JENYNS.—"Monog. of the British Species of *Cyclas* and *Pisidium*." Cambridge Phil. Trans., Vol. iv.

LEYDIG.—"Ueber *Cyclas cornea*." Müller's Archiv., 1855.

LOVEN.—"Bidrag til Känned. om Utweckl. af Moll. Aceph. Lamellibr." Kongl. Vetenskaps-Akad. Handl. Stockholm, 1848-50.

NELSON and TAYLOR.—(List of Yorks. Moll., numerous references). Y.N.U. Trans., 1878, &c.

PRIME TEMPLE.—"Monog. of the species of *Sphæriidæ* of North and South America." Proc. Nat. Acad. of Sci., Phill., 1861-2.

PRIME TEMPLE.—"Syn. of the *Cyclades*." Proc. Nat. Acad. of Sci., Phill., 1860.

SCHMIDT.—"Ueb. d. Entwick. von *Cyclas calyculata*." Müller's Archiv., 1854.

STEPANOFF.—Ueb. d. Geschlechtsorgane u. d. Eutwick von *Cyclas*." Archiv. f. Naturgeschichte, 1865.

WESTERLUND.—"Fauna der in der Palaärct. Region, lebenden Binnencorch." Vols. i.-vii. and suppl., 1884-90.

—W. E. C.

On the Development of *Buccinum undatum*.—Is there any good account published on the development of this species? If so, I should be glad of references.—A. T. Hall.

ANSWERS TO CORRESPONDENTS.

Where a reply is desired by post a stamped and addressed envelope should be enclosed.

All Communications intended for publication must be authenticated with name and address of sender.

HON. SECRETARY.—We shall be pleased to supply "The Conchologist" to your society for 2s. 4d., and any other societies whose funds will not admit of an ordinary subscription.

LINCOLN.—Your list was returned to the old address. We regret we cannot accept the same. Articles on the *Anatomy*, *Life-history*, or *Variation* we shall be pleased to consider.

E. T.—But little has been written on the subject you name. We feel certain a careful study would well repay you and be of great value to English readers. There is no reason why the publication should be a loss, if the matter is well managed.

J. F. B.—Thanks for offer; we have plenty at present.

No. 1. MARCH 25th, 1891. Vol. I.

THE CONCHOLOGIST

A Quarterly Magazine for Conchologists.

EDITED BY

W. E. COLLINGE.

Contents:

LONDON - - - SWAN SONNENSCHEIN & CO.
LEEDS - - - - J. S. SYMINGTON, PARK LANE.
BIRMINGHAM - - THE NATURALISTS' PUBLISHING CO.

PRICE NINEPENCE.

No. 2. JUNE 24th, 1891. Vol. I.

THE CONCHOLOGIST

A Quarterly Magazine for Conchologists.

EDITED BY

W. E. COLLINGE.

Contents:

LONDON - - - SWAN SONNENSCHEIN & CO.
LEEDS - - - - J. S. SYMINGTON, PARK LANE.

PRICE NINEPENCE.

No. 3. SEPTEMBER 29th, 1891. Vol. I.

THE CONCHOLOGIST

A Quarterly Magazine for Conchologists.

EDITED BY

W. E. COLLINGE.

Contents:

LONDON - - - SWAN SONNENSCHEIN & CO.
LEEDS - - - - J. S. SYMINGTON, PARK LANE.

PRICE NINEPENCE.

No. 4. DECEMBER 24th, 1891. Vol. I.

THE CONCHOLOGIST

A Quarterly Magazine for Conchologists.

EDITED BY

W. E. COLLINGE.

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LONDON - - - SWAN SONNENSCHEIN & CO.
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